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UNIVERSITY OF ALBERTA

KEYBOARDING AS A TOOL IN A GRADE 2/3 CLASS

BY

PATRICIA J. BURNSTAD

A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTER OF EDUCATION

DEPARTMENT OF SECONDARY EDUCATION

EDMONTON, ALBERTA

SPRING, 1991

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SUBMITTED BY: PATRICIA JEAN BURNSTAD

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE OF MASTERS OF EDUCATION

S. Ubelacker
DR. S. UBELACKER, SUPERVISOR

L. Beauchamp
DR. L. BEAUCHAMP

DR. A. MACKAY

DATE: MARCH 18, 1991

ABSTRACT

KEYBOARDING AS A TOOL IN A GRADE 2/3 CLASS

This qualitative study describes how keyboarding was taught and used by a grade 2/3 class. The instruction was totally teacher-led. How did grade 2 and 3 students relate to the computer and could they use the keyboard for other subjects such as language arts and mathematics?

The time spent in this setting was from September 18, 1987, to June, 1988. The role of the researcher was that of participant observer. Information was gathered primarily through observations, conversations and interviews with the students, keyboarding instructor, principal, and teacher. Activities involved with keyboarding such as drills, games, art pictures, and timings were observed and described.

The elementary students preferred computers over pencil and paper for language arts. They felt it was faster as corrections could be made easily. The students disliked the mechanical aspects involved with computers.

The students, parents and teaching staff were very positive about elementary students using computers.

An important finding was that elementary students could "touch type". The methods and materials, however, of teaching "touch typing" to elementary students were quite different from those used for junior or senior high students. Instruction had to be visual, oral, and relevant to the students' age level.

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CHAPTER 1

INTRODUCTION

WHY STUDY KEYBOARDING?

With the introduction of the computer into the school system many changes have occurred within keyboarding classes in secondary schools. Many students are entering high school knowing how to keyboard. Assuming they work or play on the computers, with no formal instruction, they develop their own system for using the keyboard. Most of these systems are of the "hunt and peck" or "biblical" method. "Seek and ye shall find." This method may prove adequate for operating a microcomputer, but it is not using the computer to capacity.

In typing/keyboarding classes students have to unlearn these bad techniques if they are to adapt to the level of skill demanded by a business program. However, any typing instructor who has the experience of teaching a typist under such conditions admits that the task is difficult and almost impossible.

"Two finger typing resembles smoking: more easily started than stopped."[1] Once a student can find his/her

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1. CABET, "Canadian Association of Business Education Teachers (CABET)" Presentation to the Council of Ministers of Education, Toronto--April 28, 1987, Cross-Canada Comment, Vol. XVII, No. 1, Fall, 1987, pg. 8.

way through the keyboard it is difficult to teach him/her to give up speed to learn correct technique and practice drills.

> Keyboarding needs have now obviously expanded to include elementary school children, who under current practices will have inadequate habits of operation by the time they reach junior high typewriting classes.[2]

If a child does not have keyboarding skills, when they compose stories on a typewriter or a computer they spend more time hunting for the correct key than focusing on the story being written. They produce very little. When composing at the keyboard they lose their flow of thought because of their focus being on the mechanics of keyboarding. There is much searching from paper to screen to keyboard in composing a document. This process can be frustrating.

More students have access to computers at home than five years ago. Many schools have computers and are purchasing more each year. They work and play on computers at home and at school. A survey done of all Alberta schools in 1986 stated there were 4,807 microcomputers in 580 elementary schools.[3] If this trend continues, every

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[2]. Stewart, Jane and Jones, Buford W., "Keyboarding Instruction: Elementary School Options", Business Education Forum, April, 1983, pg. 11.

[3]. Alberta Education, Microcomputers in Alberta Schools--1986, University of Alberta, June, 1986.

student in our school system will be using a computer in the next few years.

One wonders how and for what these computers are being used. If students are using them as a writing tool, should they use them efficiently? "It would appear reasonable that increased typing facility would contribute to improved computer facility."[4] The inability of elementary students to operate computers with facility shows a need for the business educator to assist with keyboarding skills at the elementary level. Business educators must know how elementary students relate to and make use of computers in school.

PURPOSE OF THE STUDY

The study was designed to observe and reveal how grade 2 and 3 students relate to computers when keyboarding. Answers to the following questions were sought:

1. What communication takes place between students, between staff and students, and between observers and students when the students are working on the computers?
2. From the communication heard there are particular aspects upon which to focus such as:
    a. How are the students affected by the computers when keyboarding?
    b. How do students interact with one another when keyboarding?

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4. Hoot, James L., "Keyboarding Instruction in the Early Grades Must or Mistake?", Childhood Education, Vol. 63, No. 2, December, 1986, pg. 95.

c. Are the students competitive when working on the computers?

d. Do boys and girls react differently to the computers?

e. Does the personal aspect of drills affect how they keyboard?

f. Are students fond of keyboarding on the computers?

g. Is keyboarding useful in language arts and mathematics?

h. Do visitors affect students working on the computers?

i. Are student's stories longer when working on the computer compared to writing by hand?

LIMITATION

How effective this study is in demonstrating students' relationships while on computers is limited to the researcher's perceptions and interpretations of the setting. The conclusions drawn will come from an indepth understanding of the setting.

This study assumes grade 2/3 students have definite views about computers and will express them. It also assumes that oral communication will reveal relationships.

The use of computers in the elementary school is comparatively new. Consequently, what happens over the next few years could be quite different.

It is possible even with formal and informal interviews, field notes, and students' written work the researcher may focus in one area and bypass another aspect of the setting. Although this may be a major limitation,

with a detailed and indepth study the findings will illustrate how elementary students currently deal with computers when keyboarding.

This study is confined to one grade 2/3 elementary classroom of 26 students. This class was chosen because of the availability of computers.

DEFINITIONS

HARDCOPY: written, typed, or printed matter. It is the actual document or story printed on paper.

HARDWARE: all of the physical parts comprising a computer. Examples of hardware include the monitor, the keyboard, and the computer unit.

KEYBOARD: A peripheral device used to enter information and data into the computer. It is made up of alphabet, number and symbol keys.

KEYBOARDING: is the term used to describe the activity of entering information on the computer through the use of a keyboard.

MONITOR: A TV-like screen for displaying text.

SOFTWARE: all materials needed to operate the hardware. Examples of software include manuals and programs.

TOUCH TYPE: is the act of keyboarding through feel without looking at the keyboard or monitor.

RELATIONSHIP: is the term used to describe a natural association between two or more things. The interaction between student and machine is being studied.

KEYBOARDING GOALS

The intent of teaching keyboarding to grade 2 and 3 was to develop efficiency at using the computers. To do this

the goal was to have the students "touch type". Skills required of the students in learning to keyboard were:

1. Locate and properly use all alphabetic, shift keys and the space bar.
2. Use proper fingering and stroking technique on the keyboard.
3. Be able to use various computer parts and programs properly.
4. Sit properly (good posture) at the computer.
5. Be able to do work in language arts at the computer.

CHAPTER 2

REVIEW OF RELATED LITERATURE

EARLY RESEARCH

Keyboarding with elementary students is by no means a current development. It has been going on since the 1800's.

> In the first typewriter catalogue ever published, which appeared in 1874, the value of the typewriter to children was emphasized So the idea is as old as the machine itself.[5]

Educators from the late 1800's to the present day have been expressing their belief that typing will aid students in their studies. Many of these early educators were of the opinion that typewriters be utilized in the secondary school and not with elementary students.

Not much was done until the late 1920's and 30's in the research of typing at the elementary level. Of the studies that were done most were of the experimental nature.

> A control and an experimental group of elementary school pupils were usually equated, taught, and tested to determine the influence of a variable factor--the use or nonuse of typewriters.[6]

Some investigators used only one group while other investigators used the questionnaire method. Ralph

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5. Unzicker, Cecelia E., An Experimental Study of the Effect of the Use of the Typewriter on Beginning Reading, Bureau of Publications, Columbia University, New York City, 1934, pg 1.

6. Rahe, Harves Christian, Research in Typewriting Prior to 1949, Indiana University, 1951, pg. 310.

Rowland[7] did a study in 1929 on whether or not elementary students have the ability to type. His sample was small and the time short. Within 15 weeks his grade five and six class reached an average speed of 54 wpm.

The trend in the 1930's was to determine how typing affected students' achievement in other academic courses particularly language arts. There was no evidence given about whether or not elementary students could use the typewriter until a very comprehensive study was done by Wood and Freeman in 1929-31. They studied 15,000 students over a two-year period. Their aim was to determine "...whether typewriters should be introduced into the schools..."[8] They felt that the typewriter had two main values: it would be used in later life, and it would serve as a tool in performing school work. They found that: (1) The typewriter was a useful tool for class work because of significant gains made in spelling, word meaning, language usage, paragraph meaning, arithmetic computation, and geography. (2) Students typed at speeds equal to or greater than they could handwrite, this in turn helped them to write more. The handwriting quality did not diminish with the typing group. (3) The

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7. Ibid., pg. 296.

8. Wood, Ben D. and Freeman, Frank N., An experimental Study of the Education Influences of the Typewriter in the Elementary School Classroom, The Macmillan Company, New York, 1932, pg 179.

typewriter was a strong motivator for the students. (4) Both teachers and students were positive about using the typewriters.

Elizabeth Heffernan[9] in 1932 tried to determine the influence of sex, chronological age, mental age, spelling ability, and reading ability of elementary students on their ability to type. She found students' age, sex and ability did not relate to their typing ability.

In 1933 John Forrester[10] taught a group of 118 grade 3 to 6 students to type daily for six months. Another group of 116 students continued with their daily curriculum without typewriters. Both groups wrote 19 compositions. The typing group wrote as quickly on the typewriters as the writing group did with pencil. However, the typing group made more spelling mistakes and had a more limited vocabulary after three months of instruction. After the fourth month, both groups made the same amount of spelling errors. The differences between the two groups he found to be insignificant and so,

> ...it seems as though further experimentation, using the techniques and materials utilized in this study, would be justified in attempting to discover whether or not these same small differences would persist or whether new ones would appear after the typewriter had become a part of the standard equipment of the classroom

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9. Ibid., pg. 282.

10. Ibid., pg. 278.

and the children had acquired reasonable mastery of the mechanics of its operation.[11]

Cecilia Unzicker[12] in 1934 studied grade one students and the effect of typing on their reading achievement. She found there were no significant differences between the control and experimental groups but where there were differences they were in favour of the experimental groups. The major differences were in word recognition and perception of words. In testing the students she found that the typewriter helped the slower students more than the bright children.

A study was done to determine how the typewriter influenced the achievement of various school subjects with a focus on reading by Herbert Spencer[13] in 1934. His study included students from grades 1 to 6 in three schools in Pittsburgh. The greatest influences of the typewriter were in the reading abilities of the upper grades. The largest gains in the reading abilities were in word meaning, total meaning, and organization and fact material. In grades one to three there were no significant gains.

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11. Forester, John J., "Differences Between Typed and Handwritten Elementary School Narrative Compositions", Dissertation, Doctor of Philosophy, New York University, 1988, pg. 85.

12. Ibid., pg. 303.

13. Ibid., pg. 298.

Wayne Colahan[14] in 1935 researched "touch typing" in two elementary schools for one month. One hundred twenty students learned to touch type on nonelectric standard typewriters. They were taught by an experienced teacher. All the work typed was chosen from the students' readers. He found that the experimental group "made greater gains in reading than the nontypewriting pupils did."[15] Pupils in grades two, three, and five did better in spelling than the control group. Students in grades four and five made their largest gains in language usage and arithmetic.

Another study done in 1935 by Edith Conard[16] studied the influence of manuscript writing and typewriting on children's development. She felt,

> ...the use of the typewriter apparently is influential in developing children's ability to write compositions, does not affect handwriting detrimentally, and has a small but positive influence on ability to master other subject matter.[17]

Nellie Merrick in 1939 did a study to "determine the ability of elementary school pupils to learn touch typewriting, and the effect of using the typewriter on improvement in English usage and composition writing."[18]

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14. Ibid., pg 272.

15. Ibid., pg 272.

16. Ibid., pg. 274.

17. Ibid., pg. 275.

18. Ibid., pg. 290.

The report was not complete but she did find that girls composed at the typewriter somewhat faster than boys. Also pupils that used the typewriters were able to write compositions with more speed and less errors than did students who did not use the typewriters.

In 1942 Winnifred Templeton studied fourteen pupils from grades five to nine to determine if the typewriter promotes the growth of spelling and reading. She found, "most of the pupils raised their reading and spelling grade levels one or more school years during the eight-week experiment."[19] She also felt that students can learn to touch type as long as their hands are not too small.

In the late 1940's Mabel Hutchings established that people are interested in typewriting at the elementary level but it was not offered in many American schools at the time. "In general, the experience of those schools that offer instruction in typewriting is satisfactory."[20]

The studies done up to 1949 tended to use small samples and were done for a very short duration. Except for the Wood and Freeman study, they were inconclusive.

1950 TO 1970

Very few studies were done in the 1940's and 1950's. Keyboarding with elementary students resurfaced with John

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19. Ibid., pg. 301.

20. Rahe, Harves Christian, Research in Typewriting Prior to 1949, Indiana University, 1951, pg 287.

Rowe's study in 1958. In 1944 he worked with a group of fifth graders and found that the heavy stroke associated with manual typewriters was not conducive to typing by elementary students. He did another study at the University of North Dakota in 1958 to determine if third and fourth grade pupils could touch type and would it promote the total learning process. Now portable machines were used. The study was done for 50 minutes per day for eight weeks. After eight weeks of typing the average speed was 42 words per minute. The highest speed attained was 80 words per minute and the slowest was 25 words per minute on one minute timings. "The experimental group increased seven months in vocabulary development--in eight weeks!"[21] Reading comprehension gained four months.

One year later, 1959, Esther Ceterski[22] stated that the most positive effect of teaching touch typing to a grade five class for five months was the quantity of written work done by the students. The children were able to find more misspelled words in their typed copy than in their handwritten copy.

Much of the literature written in the 1960's on keyboarding at the elementary level is in the form of

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21. Rowe, John L., "Readin', Typin', and 'Rithmetic", Business Education World, Vol. 39, No. 5, March, 1959, pg. 20.

22. Ceterski, Esther, "An Elementary School Teacher Takes a Look at Typewriting", Business Education Forum, Vol. 14, No. 2, November, 1959, pg. 13.

journal articles. C. Lloyd[23] estimated from two surveys he conducted there were 50,000 elementary students attending typing classes in 1968.

Such authors as Gratz[24], Hart[25], Merrill[26], Strong[27], Rowe[28], and Wood[29] felt that students can keyboard at any age level. Elementary students have no more difficulty with the keyboard than do high school students.

Research done by Margaret E. Brion[30] found no significant difference in academic achievement with fourth and fifth graders; but, the use of computers did provide an enjoyable experience for participants in the study. Walter

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23. Lloyd, Allan C., "Typewriting Futures", Business Education World, Vol. 48, No. 6, February, 1968, pp. 9-11.

24. Gratz, Jerre E., "An Eight-Year Old Learns to Type", The Journal of Business Education, Vol. XXXV, No. 6, March, 1960, pp. 266-268.

25. Hart, Leo B., "Typing Belongs in the Elementary Curriculum", Business Education World, Vol. 40, No. 5, January, 1960, pp. 9-11.

26. Merrill, Frances E., "What Elementary School Typing Means to the High School Teacher", Business Education World, Vol. 42, No. 6, February, 1962, pp. 16-18.

27. Strong, Phyllis, "...Sixth Grade Pupils", Business Education Forum, Vol. 17, No. 2, November, 1962, pp. 15-17.

28. Rowe, John L., "How to Meet Changing Needs in Typewriting", Business Education World, Vol. 44, No. 1, September, 1963, pp. 9-11.

29. Wood, Marion, "Teaching Typewriting to Gifted Seventh-Grade Pupils", Business Education Forum, Vol. 17, No. 2, November, 1962, pp. 14-15.

30. Brion, Margaret Estelle, "Evaluation of the Use of the Typewriter in Grades Four and Five", Boston University, 1961.

Sorgatz[31] was in agreement with Brion. He studied sixth and seventh graders and found that the students could type faster than they could write, but their academic gains were not significant. Tootle[32], on the other hand, found that fifth grade students gained significantly in handwriting speed, handwriting quality, and arithmetic achievement when using the typewriter to do their exercises. The typewriter had a positive effect on the written communication activities of fifth-grade students.

In 1965 Nathan Krevolin[33] stated that research done up to this time showed that elementary students could type and it improved their language arts. He studied a grade five class and found that students gained four months in word meaning, five months in paragraph comprehension, and seven months in spelling ability. At the end of the experiment he found that students averaged 34.4 words per minute with 3.5 errors for three minute timings. He recommended that typing be taught at the grade 5 level and the course should be one semester long. Lessons should not

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31. Sorgatz, Walter Carl, A Study of some of the Effects of Instruction in the Use of the Electric Typewriter on the Academic Performance of High Achieving Sixth and Seventh Grade Pupils, Arizona State University, 1964.

32. Tootle, John C., "Typewriting in the Written Communication Activities of the Fifth Grade", The Delta Pi Epsilon Journal, Vol. VII, No. 3, May, 1965, pp. 65-76.

33. Krevolin, Nathan, "How Can We Best Implement Elementary School Typing Courses?", Business Education World, Vol. 46, No. 3, November, 1965, pp. 10-15.

be longer than 30 minutes. He felt it was important to have the elementary classroom teacher instruct the course. He felt that more studies be done to determine how to implement keyboarding effectively into the elementary school.

Richard Bloomer[34] studied a group of first graders in two schools in Connecticut and one in Texas. Each school had 60 students randomly picked. There were two experimental groups and two control groups doing the reading-linguistic program. The teacher would give the phonetic sound and the student would type its letter. His findings showed that the experimental group were significantly superior to the control groups in paragraph meaning, word study skills and spelling on the Stanford Achievement Test.

RECENT RESEARCH

Many of the authors of journal articles during the 1970's and 1980's wrote there was a need for keyboarding in the elementary school. With the advent of technology, much was changing in the students' world. The typewriter and the computer were part of this technology. With the technology came problems as stated by Dorothea Schrader,

> (1) the function of the keyboard in computer applications has been ignored and (2) a generation of students has become accustomed to using the

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34. Bloomer, Richard H., "Using the Typewriter to Improve Reading Ability of First-Graders", Business Education Observer, Vol. 40, Spring, 1969, pp. 24-28.

"hunt and peck" method for inputting data/information into computers.[35]

The use of poor keyboarding techniques hinders students in later grades from attaining speed and accuracy needed for business applications. With poor techniques showing up in the higher grades, business educators were becoming concerned with this trend.

Many authors postulated that keyboarding be taught as stated in the policy statement put out in 1987 by the Policies Commission for Business and Economic Education in British Columbia, "WE BELIEVE THAT KEYBOARDING SHOULD BE REQUIRED OF ALL STUDENTS."[36] There is a general awareness that keyboarding skills will allow students to use computers more efficiently. Even though many authors stress the need for keyboarding very little research in this area has been done. There is very little literature on the actual teaching of keyboarding. A number of projects have been done but there was and still is an absence of keyboarding research studies with elementary students.

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[35]. Schrader, Dorothea, "The Relationship of Motor Proficiency, Sex and Age to Keyboarding Achievement of Elementary School Students", The Canadian Journal of Business Education, Vol. 1, November, 1988, pg. 18.

[36]. B.C. Policies Commission for Business and Economic Education, "Keyboarding: A Business Education Concern", British Columbia Business Education Association, Vol. 27, No. 3, April, 1987, pg. 7.

From research done to date "...it has been established that intermediate-level pupils have the physical and mental maturity to learn typewriting."[37] It was known,

> the utilization of the typewriter in reading programs, especially in language experience programs, has resulted in many practical activities that can be incorporated into other language programs.[38]

The relationship between language arts and typing will continue to grow.

Research has found that typing accelerates language arts skills. A study done by Misenoff[39] found that slow learners can be successful in both reading and typing. Haggblade[40] also felt that the typewriter may have a definite contribution for students with problems in word perception. The areas where the typewriter would be most beneficial were: (1) Typing would lessen problems of reading from left to right. (2) Students' vocabulary of sight words would increase. (3) More discrimination toward word detail would occur with the typewriter.

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37. Toler, Wilma M., "Typing for Elementary Students", Illinois Career Education Journal, Vol. 30, No. 3, September, 1973, pg. 21.

38. Seltzer, Ronald and Dianne, "Typing Keys Unlock the Doors to Reading Enrichment", Business Education Forum, February, 1978, pg. 10.

39. Misenoff, Ann, "STAR: Students' Typing and Reading", Business Education Forum, December, 1978, pp. 123-125.

40. Haggblade, Berle, "Using the Typewriter for Learning: Reading", Balance Sheet, Vol. 58, No. 3, November, 1976, pp. 106-111.

In the research studies, it was found students could keyboard and used the computer for various school subjects particularly language arts. Dorothea Schrader conducted a study in 1987 in Regina, Saskatchewan, on a group of ten, eleven, and twelve year olds. The purposes of this study were to (1) determine relationships between certain student characteristics (motor proficiency, sex and age) and keyboarding achievement on computers, and (2) at what level students could touch type. The students were taught for twenty consecutive school days for forty minute periods. These students,

> ...learned keyboarding at a similar achievement level; but that individual keyboarding achievement was related to their motor proficiency, but not to their sex or age."[41]

The gross words per minutes. ranged from 7 to 23 for the group. The most important fact was that the students could touch type.

Some articles voiced opinions on how typing instruction should be conducted at the elementary level and by whom. A course taught at the elementary level should take into consideration the needs and abilities of students at this level. A successful typing program "...is no place for a

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41. Scharader, Dorothea, "Report of Regina Research Computer Keyboarding for Elementary School Students", SBTA Intercom, Vol. 22, No. 2, Winter, 1987, pg. 3.

diluted version of ordinary senior high typing."[42] Babbs and Cline studied a group of grade fives. They confirmed that grade fives can type but they should not taught to type by the same guidelines as used for high school students. The ideal program would contain the following elements:

1. specification of appropriate performance goals,
2. reassessment of the learner,
3. provision of appropriate instruction that includes validation of the learning through proper repetition and with measurement of the learning against some criterion,
4. selection of appropriate evaluation procedures...[43]

Sinks and Thurston[44] did a study on school achievement in elementary grades. They studied 36 grade three and four students who attended a six-week summer typing course. Testing was done before and after the experiment. High motor dexterity subjects scored higher than low dexterity subjects. They felt their findings supported the Wood and Freeman study in that gains were positive but small.

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42. Hansell, Kathleen J., "Typewriting for Emerging Adolescents:, The Journal of Business Education, Vol. XLVI, No. 5, February, 1971, pg. 199.

43. Erickson, Lawrence W., "Performance Goals at the Elementary Level:, Business Education Forum, November, 1972, pg. 20.

44. Sinks, Thomas A., Thurston, Jay F., "Effect of Typing on School Achievement in Elementary Grades", Educational Leadership Research Supplement, Vol. 29, Jan., 1972, pp. 344-348.

The articles and theses of the 1980's reflect the use of the computer for keyboarding.

> As elementary teachers welcome computers into their classrooms, children are being encouraged to do more and more writing, computing, and programming on the computer keyboard. One big stumbling block for students is their lack of typing skills.[45]

All of a sudden the terminology and the machine has changed but the basic ideas are much the same. There appears more need because computers are becoming much more common within all aspects of our lives. "Keyboarding is a necessary course for today's computer-oriented classroom. Students need to know how to keyboard properly for efficient use of the computer."[46] Besides appearing in the schools, many homes have computers. Marilyn Harris' study[47] found that parents, teachers, and administrators perceived a need for implementation in all areas of computer technology with the elementary group voicing the greatest need for computers in the school.

Use of Software to learn Keyboarding. In the 1980's the use of Computer software programs appeared in the

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45. Craighead, Donna and Switzer, Mary Ellen, "Is Typing the Key to Computer Literacy?", Instructor, Vol. 93, No. 2, September, 1983, pg. 179.

46. Kaser, Kenneth J., "Keyboarding Course for K-6", Business Education Forum, November, 1984, pg. 16.

47. Harris, Marilyn L., The Perception of Selected Elementary and Secondary School Parents, Teachers and Building Administrators Regarding the Applications of Computer Technology in the Public Schools, University of Nebraska, Lincoln, 1984.

research and articles. Cowles and Robinson[48] did a study using a software program to find out if five, six, seven, and eight year olds could keyboard. The five and six year olds progressed only to words whereas the seven and eight years olds experienced success with both words and sentences. Warwood[49] also used software programs to teach a group of fourth graders to keyboard. Fourth graders were taught for two months and did well at the end of that time; but, when tested 6 weeks later most of the gains were not maintained. Warwood felt that keyboarding had to be sustained if the students were to retain the newly learned skill.

A study done by Carolee Sormunen[50] compared two software programs for teaching keyboarding to grades four, five, and six students. She found that a software program that utilizes psychological motor skills attains higher typewriting speed achievement scores than a software program

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48. Cowles, Milly, Robinson, Mabel C., "An Analysis of Young Children and Learning Keyboarding Skills", Microcomputers, Education, and Children, Business, Youngsters, Technology, and Education Consortium, Nashville, Tennessee, September, 1984, pp. 49-54.

49. Warwood, Byrdeen and others, A Research Study to Determine the Effects of Early Keyboard Use Upon Student Development in Occupational Keyboarding, Montana State University, September, 1985.

50. Sormunen, Carolee, "A Comparison of Two Methods for Teaching Keyboarding on the Microcomputer to Elementary Grade Students", The Delta Pi Epsilon Journal, Vol. 28, Sprint, 1986.

that uses the game approach. Carol Hall[51] studied keyboarding in a grade four/five classroom to determine how well students could keyboard. Two software programs were used for this study. Hall found that after 520 minutes of instruction the students achieved a mean speed rate of 19.73 gross words per minute with an error rate of 5.96 on the timed writing instrument.

There are also studies to determine whether students learn how to keyboard better by the traditional method (touch typing taught be the teacher) or by computer programs in keyboarding. A study done by Timothy Anderson[52] found no significant difference between the computer assisted instruction and the traditional approach to teaching keyboarding skills to grades three and four students.

Not as much research is being done on the affect of keyboarding on other school disciplines. Eleanor Bujea stated,

> Many studies have proven that children can input through touch keyboarding at a rate of up to three times faster than their handwriting rate and that they can do this accurately and automatically, enabling students to input at a

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[51]. Hall, Carol S., Keyboarding in a Self-Contained Fourth-Fifth Grade Classroom, University of North Carolina, July, 1985.

[52]. Anderson, Timothy Earl, Traditional Method Versus Computer-Aided Instruction in Teaching Keyboarding Skills to Elementary School-Age Children, University of Nebraska, Lincoln, 1983.

rate closer to the rate at which they create information mentally."[53]

A study done by Keith Wetzel[54] of fourth and fifth graders to determine the affect of computers on writing was done. He found no significant differences in the writing quality of the group using computers in process writing and the group afforded traditional instruction. Wetzel felt the lack of significant results was because of the limited time for the study and the slow typing speed of students. His findings implied that students should type as fast as, or faster than, they can write before they use computers for writing.

Who Should Teach Keyboarding? More articles are being written on how and when keyboarding be taught and who should teach it at the elementary level. Truman Jackson and Diane Berg[55] comment that if a school has a computer education program with sufficient hardware, the decision to teach keyboarding has potential to either reduce the number of computers required in a school or allow students more productive time at the computer after only 15 hours of

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53. Bujea, Eleanor, "Business Education Practices and Trents: A Literature Review", The Canadian Journal of Business Education, Vol. 1, 1988, pg. 9.

54. Wetzel, Keith Arthur, The Effect of Using the Computer in a Process Writing Program on the Writing Quality of Third, Fourth, and Fifth Grade Pupils, University of Oregon, 1985.

55. Jackson, Truman J. and Berg, Diane, "Elementary Keyboarding--Is it Important?", Computing Teacher, Volume 13, No. 6, March, 1986, pp. 10-11.

keyboarding instruction. They go on to give the amount of time, the type of equipment, the procedures, and who should teach the keyboarding class to the elementary child. Evelyn Kisner[56] also feels that keyboarding be taught before the grade level where the student will be using the computer for academic work.

Until 1986 Barbara Williams[57] felt that only certified teachers should teach keyboarding. During the summer of 1986 a summer program was offered at the University of Wisconsin-Superior. Both business and elementary teachers were given inservice to teach keyboarding to elementary students.

> Interestingly, the business teachers tended to incorporate their businesslike approach into their teaching style--even with younger children.[58]

Elementary teachers were more knowledgeable at handling elementary students.

> By the time they completed three weeks of learning, observing, and microteaching, they could

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56. Kisner, Evelyn, "Keyboarding--A Must in Tomorrow's World", Computing Teacher, Vol. 11, No. 6, February, 1984, pp. 21-22.

57. Williams, Barbara, "Preparing Teacher to Teach Keyboarding to Elementary Students", Business Education Forum, Vol. 42, No. 6, March 1988. pp. 27-29.

58. Williams, Barbara, "Preparing Teachers to Teach Keyboarding to Elementary Students", Business Education Forum, Vol. 42, No. 6, March, 1988, pg. 28.

also competently teach keyboarding to elementary age students.[59]

Rauch and Yanke[60] state that secondary and elementary school teachers should be working together to teach keyboarding to elementary students. Schrader[61] found that the team approach to teaching keyboarding was most effective. She advocated that provisions be made to provide,

> ...keyboarding instruction using the teacher-team approach--the business education teacher providing expertise in the keyboarding instruction, and the elementary classroom teacher providing expertise in the developmental knowledge of students.[62]

Some writers believe that keyboarding should be taught only by business educators. Bujea stated,

> Keyboarding should be taught by qualified business teachers to students at the primary and elementary levels.[63]

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59. Williams, Barbara, "Preparing Teachers to Teach Keyboarding to Elementary Students", Business Education Forum, Vol. 42, No. 6, March, 1988, pg. 28.

60. Rauch, Verda C. and Yanke, Patricia B., "Keyboarding in Kindergarten--Is it Elementary?", Business Education Forum, December, 1982, pp. 19-20.

61. Scharader, Dorothea, "Some Discoveries Made by a High School Business Teacher When Teaching Grades 4 - 7 Elementary Keyboarding", SBTA Intercom, Spring, 1988, Vol. 22, No. 3, pp. 32-33.

62. Schrader, Dorothea, "Report of Regina Research Computer Keyboarding for Elementary School Students", SBTA Intercom, Vol. 22, No. 2, Winter, 1987, pg. 4.

63. Bujea, Eleanor, "Business Education Practices and Trends: A Literature Review", The Canadian Journal of Business Education, Vol. 1, 1988, pg. 12.

Headley[64] considered it the job of business educators to help students make the computer a worthwhile tool by teaching them how to use it efficiently. Milkes[65] agreed by stating that business educators must deliver the keyboarding instruction or at least offer inservice training for elementary school teachers. This was also expressed in 1987 by the British Columbia Policies Commission for Business and Economic Education when they wrote, "WE BELIEVE THAT BUSINESS EDUCATORS SHOULD PROMOTE AND ASSIST IN THE TEACHING OF KEYBOARDING AT ALL LEVELS OF INSTRUCTION."[66]

Whoever teaches the keyboarding instruction, it is important that teaching of keyboarding start in the elementary school and continue to the post-secondary level. Barbara William sums it up in one sentence,

> Teachers and appropriate administrators must work together to devise an articulated plan that begins at the elementary level and continues through high school, with the learning experiences becoming more advanced as time goes on.[67]

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64. Headley, Patricia. L., "Keyboarding Instruction in Elementary School", Business Education Forum, December, 1983, pp. 18-19.

65. Milkes, Julian A., "Integrating Business Education Technology Into the Elementary Curriculum", Business Education for a Changing World, NBEA Yearbook, No. 25, 1987, pp. 40-49.

66. Policies Commission for Business and Economic Education, "Keyboarding: A Business Education Concern", British Columbia Business Education Association, Vol. 27, No. 3, April, 1987, pg. 8.

67. William, Barbara, "Preparing Teachers to Teach Keyboarding to Elementary Students", Business Education Forum, Vol. 42, No. 6, March, 1988, pg. 28.

How Should Keyboarding be taught? Carolee Sormunen[68] addresses the issue of how to teach keyboarding at the elementary level by providing inservice workshops. Barbara Williams[69] also advocates teaching elementary teachers how to teach keyboarding.

Keith Wetzel[70] states that elementary students need to type quickly and accurately enough to make efficient use of the computer. He feels that the regular classroom teacher, with minimum training, should teach keyboarding to the elementary student.

Cameron[71] states that the grade 4 to 7 students in their school in Saltspring Island, British Columbia, were taught to keyboard and could keyboard at 10 to 30 words per minute. The teaching staff initially tried to teach writing on the computer but found that students without keyboarding experience spent most of their time searching for keys and producing very little. The students had major difficulties writing on the computer when they did not have

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68. Sormunen, Carolee, "Inservice Workshops" One Answer to the Issue of Elementary School Keyboarding", Journal of Business Education, Vol. 60, No. 1, October, 1984, pp. 14-17.

69. Williams, Barbara, "Preparing Teachers to Teach Keyboarding to Elementary Students", Business Education Forum, Vol. 42, No. 6, March, 1988, pp. 27-29.

70. Wetzel, Keith, "Keyboarding Skills: Elementary, My Dear Teacher?", Computing Teacher, Vol. 12, No. 9, June, 1985, pp. 15-19.

71. Cameron, John, "Keyboarding in the Elementary School", Computers in Education, Vol. 3, No. 7, March, 1986, pp. 8-10.

keyboarding skills. There was much searching from paper to screen to keyboard when composing a document. When the students knew how to "touch type" they could keyboard faster than they could write. Their time at the computer was spent concentrating on composing and editing rather than the mechanics of keyboarding. They were capable of using the keyboard as a writing "tool". Cameron feels strongly that students should use proper keyboarding techniques. They will not learn to touch type on their own or with a software program, consequently they must be taught by a qualified instructor.

Stewart and Jones[72] comment that keyboarding needs have now obviously expanded to include elementary school children. Children are developing their own systems for learning the keyboard, so rather than wait until these students are in the high school they should be taught to keyboard now. They considered four options for delivering keyboarding to elementary students: summer courses, evening classes at the high school, use of high school facilities at other times, and take the machines and teacher to the elementary school. Margaret Erthal[73] sent out a questionnaire to 186 schools in Illinois. She found that

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72. Stewart, Jane and Jones, Buford W., "Keyboarding Instruction: Elementary School Options", Business Education Forum, April, 1983, pp. 11-12.

73. Erthal, Margaret J., "The Status of Keyboarding", Journal of Business Education, Volume 60, No. 5, February, 1985, pp. 192-193.

keyboarding was not taught in very many Illinois schools until grade nine or ten. Elementary students run software programs but do not keyboard. Rigby[74] felt that because computers are used by everyone from elementary students to business executives a basic touch typing course should be taught so individuals can use the computer efficiently.

Reactions of Students to Computers. Very little research has been done on how students use and react to computers. A qualitative study on attitudes of fifth graders by Laurel Kahn[75] found that all were positive toward computer use. Their favourite uses of the computers were for games and programming. These students did not see any negative aspects to computer use.

Pros and Cons of Teaching Keyboarding Within the literature on keyboarding at the elementary level, there are some authors who are adamant that students learn to keyboard at the elementary level and then there are those who feel that students should not keyboard at the elementary level. There is, of course, the person who takes the middle road. June Cooper[76] summed up these three points of view. There

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74. Rigby, Sue, "Keyboarding is for Everyone", Business Education Forum, October, 1983, pp. 13-14.

75. Kahn, Laurel Spak, An Exploration of Fifth Grade Students' Attitudes Toward Microcomputer Use, University of Massachusetts, 1985.

76. Cooper, June E., "Computer-Assisted Keyboard Learning: A Hypothetical Model for an Integrative Approach to Keyboard Learning at the Elementary School Level", The Canadian Journal of Business Education, Vol. 1, November, 1988, pp. 30-39.

is (1) the dissenting view, (2) the advocate view, and (3) the middle-of-the-road viewpoint.

Cooper's dissenters say that it is easier for students to use a keyboard than use pen and pencil. This means that they will stay away from pen and pencil and use the keyboard instead. The child may focus more on the fingering than the actual story. Some also feel that the child's hand is not large enough for the keyboard.

The advocates say that students are already using the computer at the elementary age so they should use it efficiently. If poor habits are learned at this age, it is difficult to correct them later.

Those in the middle-of-the-road feel that elementary students should know how to keyboard but they do not feel that elementary students should have to go through the same rigorous training as high school students. The instruction should consider the physical development and type of work encountered by an elementary student. The student should learn to keyboard when the need arises. If using typing tutorial programs, they must be chosen with care.

SUMMARY

From the early 1900's to present day many authors have voiced opinions on elementary students typing or keyboarding. Many feel that the typewriter will help the student to improve their writing, spelling, composition, and vocabulary. Up to 1950 there was little information

concerning any type of typing program at the elementary level and even less about typing instruction. From 1960 on computers have become part of our daily lives. Students use computers from an early age. There has been a number of articles and papers voicing a need for keyboarding at the elementary level. More research needs to be done on keyboarding instruction for elementary students.

Chapter 3

METHODOLOGY

MY INTRODUCTION TO THE SETTING

The researcher's initial involvement in this setting occurred early in the 1987-88 school year. The keyboarding instructor, who was my advisor, needed assistance in teaching a keyboarding course to a grade 2/3 class in Sunrise School. Arrangements were made with the school for me to help her with the teaching of keyboarding. My duties included observing and helping students with their keyboarding, tutoring individual students that were having difficulty, and just being available to assist when needed. There was no thought of using the school for my thesis setting.

At that time I was enrolled in a Sociology Research course using Ethnography as a research method. One of the course assignments involved conducting an interview. Since I was already working in this setting, I investigated the possibility of completing the assignment within this setting. The classroom teacher agreed to be interviewed. The first interview was done in December. Now the thought of using this setting for my thesis started to blossom.

In January, 1988, I decided that I would use this setting for my thesis if I could obtain permission from the school. An informal request to the principal and the classroom teacher was solicited. They agreed. However,

formal approval was necessary. The school system and the University had procedures and policies for conducting research in any school in the city. I made a formal request to the Public School System. On the application form such items as purpose of study, place, time, value of research, and contact personnel were provided. The application was approved and my research began in earnest.

RESEARCH DESIGN

My role in this setting was that of participant observer. It was important that I gain the students' trust so all the activities had to remain natural. It was important that the students feel that I was part of the setting and so not give me any special attention. If in the setting long enough the students would not pay any attention to me and go about their work naturally. It was also important that the teacher be comfortable and not feel that I was interfering in her classroom. One of my initial aims was to gain trust of all the individuals involved in the setting.

There was a problem with this role as participant observer rather than simply observer. It was not always possible to get a full picture of what was happening when helping a student do such things as load disks, edit copy, or use proper keyboarding technique. Focusing was an extremely difficult process. When one was so busy with

individual students there were times when it was difficult to remember what one's initial focus was for the day.

INITIAL FOCUSING

In the beginning I focused on how the students keyboarded. I found that I was going from student to student to note the exact process of keyboarding. They would keyboard differently everyday so it was very difficult to determine the pattern involved. I found that I was always helping or noting what the boys did so I focused on how the boys keyboarded compared to the girls. I wondered if maybe the boys tended to be more demanding than the girls. The girls worked quietly with little fuss.

Did the time affect how the students worked on the computers? This question came into focus when I was at the school one morning at 11:15 and the behaviour was definitely different. Normally I arrived at the school at 9:00 a.m. The students were more active and their attention tended to be on many things other than instruction or lessons.

FINAL FOCUSING

The question I finally focused on was, "How do students relate to computers at school." It was much easier to focus on the conversations of the students with each other, guests, their instructors, and myself. While helping individual students, it was easier to focus on various

dialogues. By now interest developed on how the students used the computers to work in the language arts field.

FIELD NOTES

Writing of a daily log was done from September 18, 1987, to June, 1988. The prime sources of data came from watching, listening, and asking questions. Field notes consisted of descriptions of daily events, conversations between students, conversations between the classroom teachers and students, and conversations with students, the classroom teacher, and the keyboarding instructor. Notes were descriptive rather than interpretive. Within the notes, however, were interpretations given to a particular event or conversation. The initial writings were sketchy and not very detailed. To begin with they were no more than half a page. The longer in the setting the longer the diary became. Instead of one half page of notes they were becoming three and four pages long per sitting. As time went by, more observations were made. I began to focus on various aspects of the setting, such as dialogue when the teacher was in the room versus dialogue when the teacher was out of the room.

The collection of mental ideas was made while talking to the keyboarding instructor, classroom teacher, or students. These were journalized later in my notebook. Jotting down ideas had to be inconspicuous. The students were very much aware of anyone jotting down observations and

ideas and wanted to know what I had printed in my journal. They would then insist that their statements be recorded. This appeared rather artificial when one wanted spontaneous responses.

In order to have more than one copy of the field notes, I typed them on the computer using a word processing system. When keyboarding my notes in the evening, I found various items would stand out. Notes were recorded of the various ideas that came forth at these times.

INTERVIEWS

An interview with the teacher was done before Christmas. Additional interviews were done with the principal, students, keyboarding instructor, and the teacher at the end June, 1988. The purpose of the interviews was to determine how the various participants in the setting viewed keyboarding on the computer.

Interviews with the classroom teacher, principal, and the keyboarding instructor were formal. Questions to be followed during the interview were drafted before the interview was conducted. These questions served as a guide and were not followed verbatim. It was important that the interviewees felt free to speak plus introduce items that they felt were important. Depending on the direction that the interview took, I adapted to the interviewee. Much work was done on the interview beforehand so leading questions would be eliminated.

All interviews with the principal, classroom teacher, and the keyboarding instructor were recorded on tape. If notes had been written during the interview, I would not have had time to listen attentively. By taping the interviews, I could focus on the responses. By centering on the interviewee important points could be examined and clarified. It facilitated thinking ahead to questions that arose from the interview and not necessarily from the interview guide. It was important to listen attentively and communicate to the interviewee that she had my full attention. During the interview, items were jotted down so further probing could be done later. Transcription of the interviews was done word for word. From the hard copy various points were concentrated on for further study.

Interviewing the students was done informally. The questions were written beforehand. Rather than use a tape recorder which the students tended to perform for, I decided informal interviewing would be more successful. It was felt that a long, lengthy interview would lose the student's interest. It was decided to do one question per class period. While helping the students with their various writing and editing jobs, a question would be asked of that student. This process went on for about a month and was extremely interesting and much enjoyed. The students were very conscious that what they were saying was being written down. In fact, some of them would check how much the other

student had said so they could tell me more and have more written on the page.

DOCUMENT COLLECTION

Throughout the year, with the permission of the classroom teacher, examples of the students' work were collected, photocopied, and returned to their files. From September to December, 1987, the work collected was keyboarding work that the students had done. From January to June, 1988, their language arts work was collected.

VIDEO AND PHOTOGRAPHS

In June, 1988, I photographed the students at the computers. Photographing was done of all the students. This was important as the children individually insisted that his/her picture be taken.

On June 1 it was decided if still photos were good, action shots would be better. A video camera was borrowed from the University Resource Centre. The resource centre personnel insisted there would be no problem as the video camera was very simple to use. Unfortunately, some experience would have been an asset as the first video tape taken had more shots of the ceiling, walls, and floors than any student keyboarding. A second attempt was made and then a great deal of splicing and editing had to be done to obtain an acceptable copy.

The analysis of the data was an ongoing process. It was both formal and informal. Data collection was done daily. Whether in the classroom or just sitting and thinking about the students, observations and thoughts were recorded in a journal. Analysis of the data involved examining the journal entries for consistencies and patterns. Once a patten appeared it was highlighted, then put in chart form. More patterns emerged from the chart. These patterns were then focused on when the researcher returned to the setting. This collecting, reducing, displaying, and drawing conclusions from the data was a cyclical process which occurred throughout the year.

CHAPTER 4

SUNRISE ELEMENTARY SCHOOL

GENERAL SETTING

September 18, 1987, was my first day in the setting where I spent many hours over the 1987-88 school year. The keyboarding instructor and I drove to the school from the university on a warm Fall day. Sunrise Elementary School was in the southern part of the city. The drive to the school took us through two busy traffic circles, past a junior high school, a school for the deaf, tiny shops, and a small shopping center. Three blocks east of the school was a large shopping centre where we turned right. This main thoroughfare just travelled was busy. As we drove along this busy street, and turned right, it was like going from one extreme to another. The main street was always busy with cars and people rushing about. Turning west towards the school, there was less traffic and the area appeared quiet and serene. The area was well landscaped with many beautiful trees and flowers. Quiet suburban homes surrounded the school.

THE SCHOOL

Sunrise Elementary School was on a quiet suburban street. Red bricks and a white trim around the top of the school met my eyes when we drove up to the school. The lawn around the school was well-kept with some trees dotting the

landscape. Two doors faced east where many of the visitors parked along the street. The staff parking lot was situated on the north end of the building. The playground for the children was on the west side of the school and was well equipped with heavy wooden and metal playground furniture.

Sunrise was a small nine-room elementary school with classes ranging from Kindergarten to Grade six. For the school year 1987-88 there were 202 pupils. The staff was composed of one principal, 7 full-time teachers, 3 part-time teachers, 3 part-time teacher's aides, and a full-time secretary.

Upon entering the south-east door the first thing I noticed were racks of small shoes and rubbers on both walls. Directly in front of me was a hallway going north and south. Turning right we passed the principal's office, continued to the staff lounge where we hung our coats. It was nearly 9:00 a.m. so we left the staff lounge, turned left and proceeded past the gymnasium, music room, and library which were on our right.

Several rooms in the school were utilized by groups in the community for classes such as music and day care. Throughout the day there were always parents and children coming and going.

My time in the school was primarily spent in the grade 2/3 classroom. However, some time was spent in the music room when assemblies were held and also in the open-area

library. If the students required information during class, they were free to leave the room and go to the library and look up the information they needed. It was also in the library that I helped the teacher with her computer survey of the students.

THE TEACHERS' LOUNGE

Occasionally I would go to the teachers' lounge. The lounge was a large room with two doorways. At the southern door there was a coffee maker and hot water. Near the door was a sink, stove and refrigerator. Frequently when arriving in the room, I would find the kindergarten class baking. A bulletin board divided one part of the room. On the bulletin board there were schedules, notes, timetables, etc. Large tables joined in a rectangular shape dominated the room. This was where the staff would sit for their short break. A telephone and couches were located in the north end of the room. In the year I did not see anyone use the couches. On the north wall there were always colourful displays.

ASSEMBLIES

Every Monday morning school assemblies were held in the music room. The room was large with rows of steps where the students sat. Guest speakers came in from the community. Some of these guests included a blind man with his seeing-eye dog and a lady from Ghana. The students would leave

assembly by singing a song and go to their rooms grade by grade. It was then time to go to work.

As we hurried down the hall toward the combination grade 2/3 classroom I could hear the sound of childrens' talking coming from the classrooms to my left.

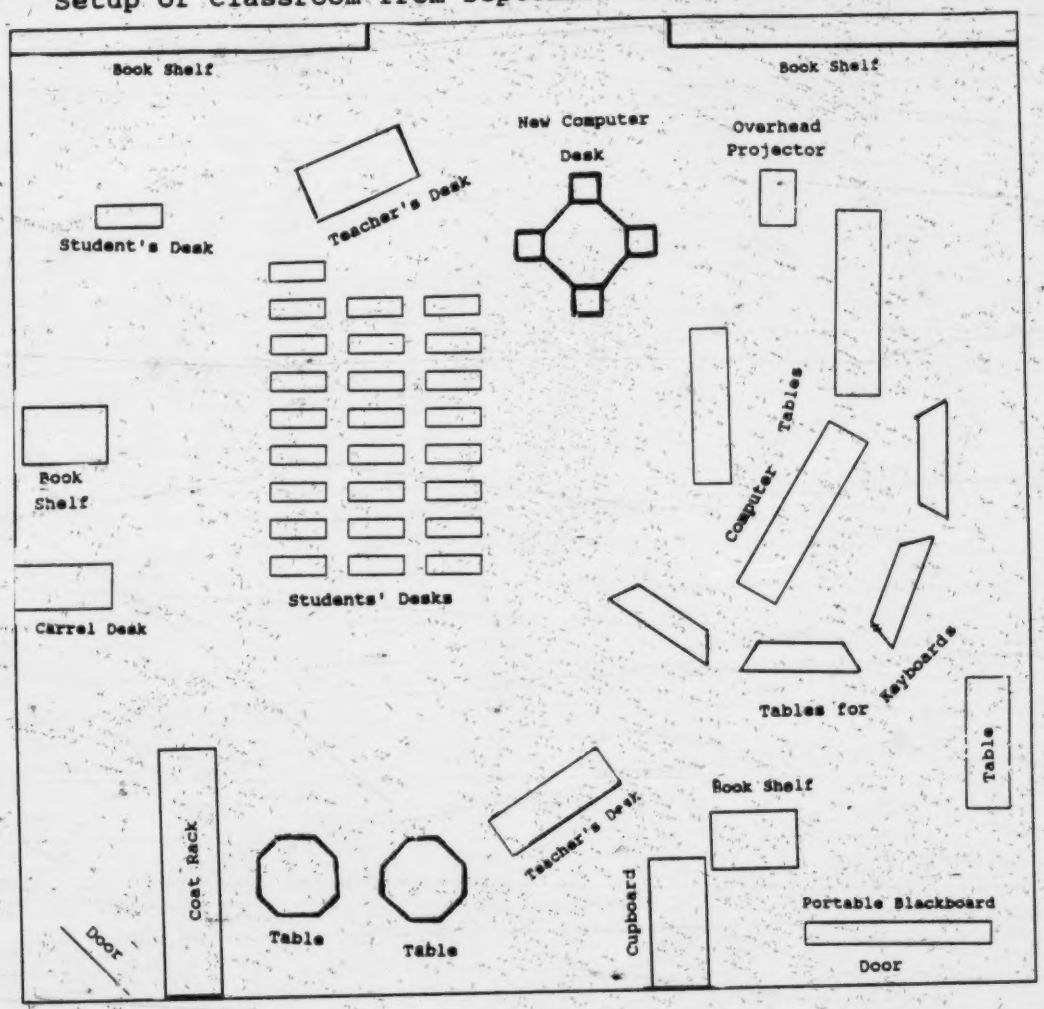
THE GRADE 2/3 CLASSROOM

The door to the classroom was open and the room was inviting. Children's work displayed on the walls and bulletin boards was noticeable from the hall. There was a buzz coming from the room.

Over the year the room changed. In September, when entering the room, the first thing observed was three carrel desks. Along the south wall were book shelves. A student coat rack was to the right of the entrance. There were two teacher's desks. One was near the south wall in front of three rows of students' desks. The other was near the north wall behind the students' desks. At the west end of the room were large tables with computers or unattached keyboards on them. There was another large entrance in the north west corner blocked by a large movable blackboard. Students did not use this entrance. On the next page is a diagram of the physical layout of the classroom from September to December, 1987.

DIAGRAM 1

Setup of Classroom from September to December, 1987

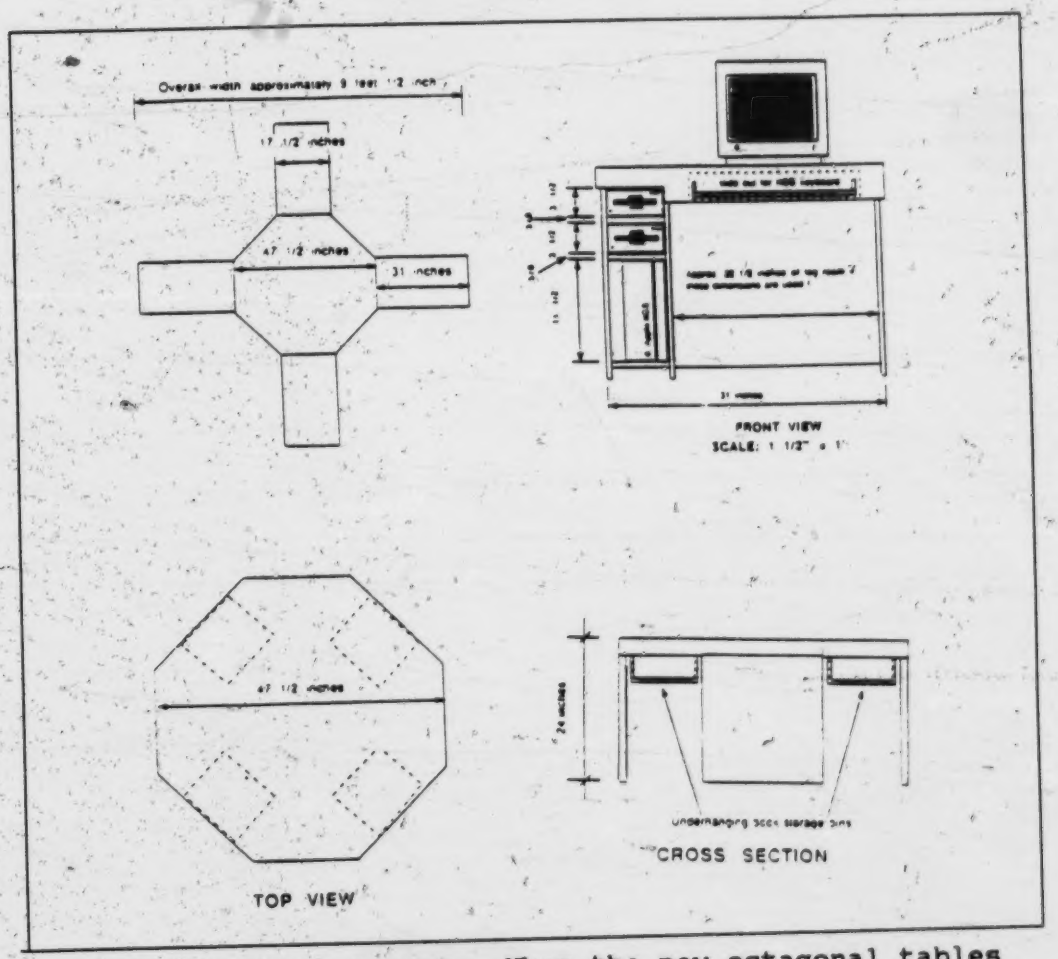


Custom-Built Furniture. New furniture arrived after Christmas, 1987. Seven octagon-shaped tables, each with four computer wings, were custom built. Three heights accommodated the different sizes of students. Provisions were made to accommodate left-handed students. The new furniture looked like satellite work stations. Each student

had regular desk space with book storage and computer work space. These work stations replaced the traditional elementary school desk.

DIAGRAM 2

Custom-built Furniture[77]



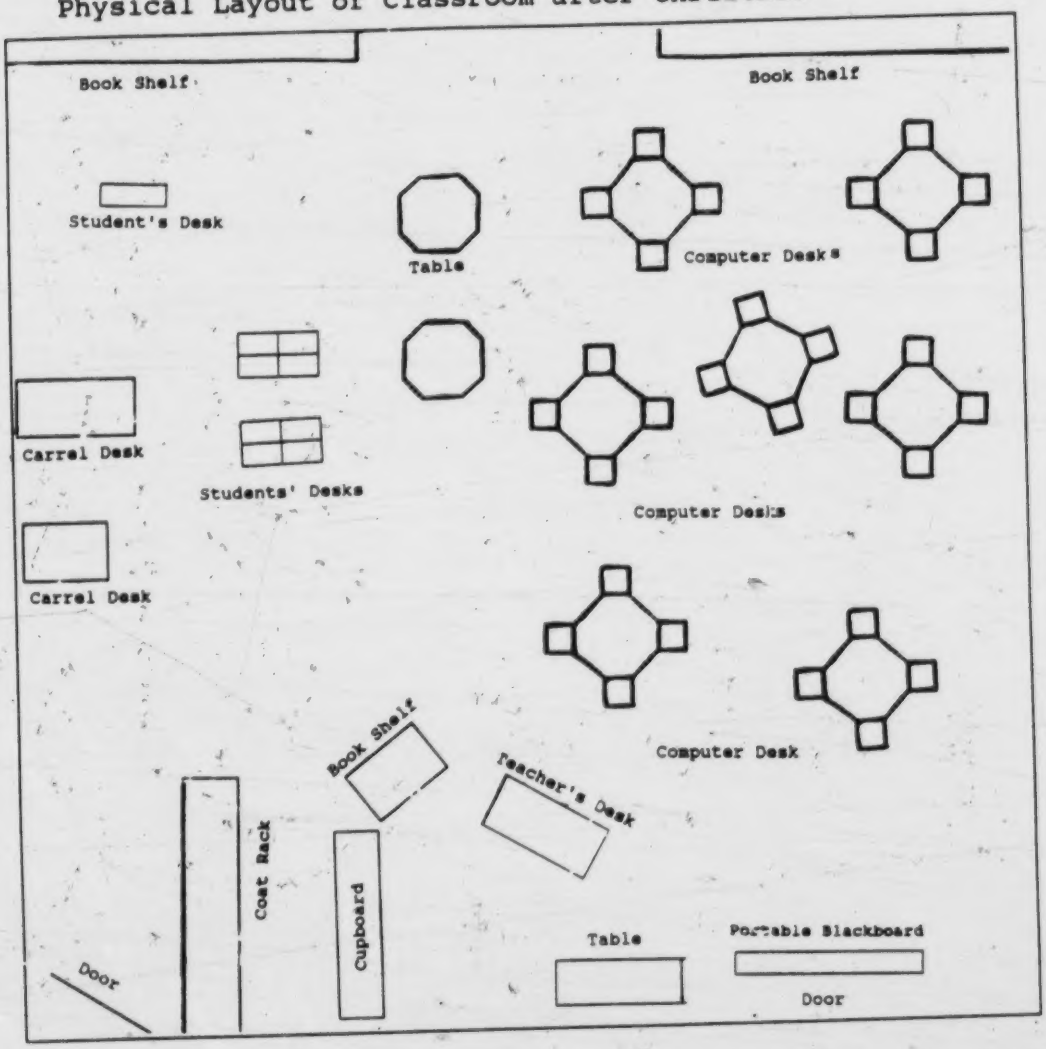
New Classroom Layout. When the new octagonal tables arrived after Christmas the students' desks stayed in the

77. Cathcart, Gloria, "Report for Period Ending June 30, 1988," Apple Canada Education Foundation Proposal #7003, June, 1988, pg. 6.

east side of the room. They were no longer in rows but were in groups of four. The large tables were removed and the octagonal tables took their place in the west side of the room.

DIAGRAM 3

Physical Layout of Classroom after Christmas



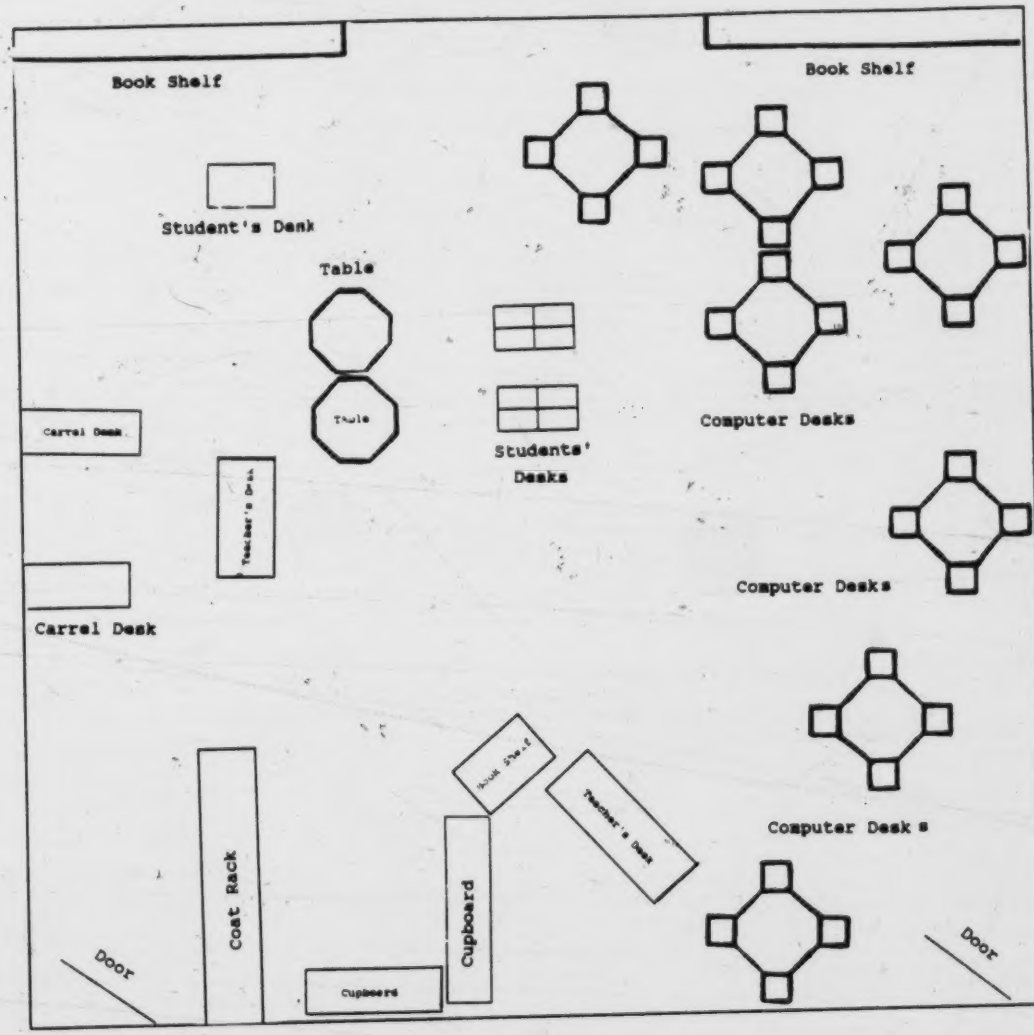
In September the room was divided into two basic areas| the computer area and the classroom area. After the new

desks arrived, the room was still divided into two areas. However, the function of the areas changed. The computer area was still for computer work. The new octagonal desks were now the students' desks. The new classroom area, however, became an area for group work rather than a class or teaching area. Most of the work that the students did during the morning took place in the computer area. The students went to a different teacher and classroom in the afternoon.

Around the end of March, the teacher moved the new custom-built desks to make the room more workable. The traffic flow for the students and teacher was cumbersome and awkward. New electrical wiring was added so cords would be concealed without having floor to ceiling posts. The outlets were attached to the furniture. There was no worry about the children tripping over cords on the floor.

DIAGRAM 4

Final Physical Layout of Classroom March to June, 1988



THE APPLE CENTRE FOR INNOVATION

For September, 1987, the Apple Canada Education Foundation (ACEF) awarded 13 Apple IIGS computers to Sunrise Elementary School. These computers were linked to two ImageWriter II printers via AppleTalk. ACEF provided AppleWorks software. Sunrise Elementary School provided the

site, classroom furniture, electrical wiring, all other software, and teacher-release time. The purpose of the Project was to provide each grade 2/3 student access to a computer for language arts and mathematics and to illustrate how computers could be integrated into a primary classroom. The computer was to be a tool for the students to use for their class subjects.

THE GRADE 2/3 TEACHER

During the previous year, at a different elementary school, the teacher, who was the Project Director, had two computers in her classroom. "With the particular group that I worked with, I had only a small group that got enough time to feel proficient at using the computer." She selected a few children who had completed their classwork to work at the computers using a "touch typing" software program. Only a few children, not an entire class, had the opportunity to use the two computers which were available.

She felt very strongly that students could benefit from the use of computers for their language arts and math. At the end of the first year of the Project, the teacher still felt that the initial objective of teaching keyboarding was to enable the students to do their language arts and math.

> We have definitely met the objective. The children can keyboard at a level now where the keyboarding is not the prime concern but rather what they are doing with their language arts is. The skills are there so they can go ahead and

write down the things they want in language arts without worrying about where the keys are at.

THE KEYBOARDING INSTRUCTOR

The keyboarding instructor became involved in the project over a cup of coffee. She was talking to the project director's spouse who was a colleague at the local university. She offered to teach keyboarding to the class. She felt that in order to use the computer as a tool for communication "touch typing" was essential. It was important to see how the students would use "touch typing" in their language arts development. "Touch typing" was to be integrated into the students' school subjects.

> About 20 years ago I read the Wood Freeman Study and became quite excited about it, but I have never seen anybody use the typewriter or computer with very young children where it was integrated across the curriculum and the typewriter or computer was just a tool rather than a subject.

This project was an opportunity for her to see how students could use "touch typing" in their language arts and other subjects.

Her objective in teaching students to keyboard was to have them "touch type" and in so doing use the computer as a tool for their language arts. At the end of the first year of the Project she felt successful.

> If you look at the students, they can "touch type", and I think they also look at the computer not as a subject in their daily program but as a tool which they use during the day in their language arts program or whatever they are doing.

THE PRINCIPAL

The principal became involved in the project for more personal than academic reasons. It gave her an opportunity to learn how to run a computer and examine the various applications available for running a school. She had managed to avoid computers up to 1987. "I felt my life was going well without them." At a principals' meeting the group was asked by the superintendent if anyone was interested in pursuing a project involving microcomputers. "I thought about it for several days but I didn't leap up and down right away as I had managed to avoid computers up to this point." To support this project, the school had to be able to provide three or four tenths teacher release time.

> In other words you had to have $15,000 extra dollars in your budget. I did, so I went and talked to the superintendent. Surprisingly, there were only two principals who wanted to pursue this type of project. What really sold me on the project was talking to the teacher. She was excited about the project which made me very enthusiastic. I was convinced that the project would work. I have always thought children would do really well or maybe better on computers.

RESEARCHER

I, as participant observer, was introduced to the setting in September, 1987, by the keyboarding instructor. I helped students who were having difficulties. I would walk around checking students' techniques and assisting

when needed. A project in qualitative research was due for a sociology course and the setting fit the assignment perfectly.

By the middle of October the entire keyboard had been taught. My work in the setting changed. Instead of helping students master "touch typing" skills, my job now was to review the keyboard and help the students with their compositions on the computer.

The students had become accustomed to me. They felt comfortable enough to elaborate on personal matters. They would either ignore me, ask questions, or speak about what had happened to them that day. They were very friendly. They asked plenty of questions, many which dealt with writing mechanics or how to get the computer to work for them. From listening to the students talk among themselves, to their teacher, and to myself, it was clear that they liked the computers. It was not unusual to hear, "It's fun to work with and play games. It is easy to write because you can get more work done faster."

VISITORS

There were 210 visitors to the classroom during the 1987-88 school year. Guests came from the University, Edmonton area, and as far away as Japan. Their effect on the routine of the class was minimal. The students actually ignored visitors! They also ignored me until

they felt comfortable enough to ask for help or to discuss a current happening in their lives.

Other children also visited the classroom. In March another class of grade two's came with their stories to be typed. The computer students were very excited about keyboarding for someone else. The grade two students read their stories and the computer students keyboarded.

> Fred: This boy is driving me crazy as he keeps talking to me and I can't get much done.

It was surprising to hear Fred say this as he was always chatting in class. One of the grade two students decided to keyboard his own story. It was painful to watch him, "hunt and peck" with one finger. The stories were saved on disks when they were completed.

There was one major mishap during this visit. I watched Dan going from the math area to the computer area. He was checking to see if Nat was done as he wanted to keyboard. Nat was not finished. He said, "I goofed up and wiped out the story."

The little grade two said, "Yuh, it went psttt then black!" Dan had to wait for Nat to finish keyboarding so he returned to the math area.

THE STUDENTS

Students did not have much choice about their involvement in the project. There were 26 students, 4 grade 2's and 22 grade 3's, involved in the Project. At

the beginning of the school year they were assigned to this grade 2/3 class, the only grade 3 room in the school. The students were very motivated and willing to learn to "touch type". When learning to "touch type", they did not have a choice. The peer group subtly pressured the students to work on the computers by their conversation and actions. They talked about playing games on the computers, having a computer at home, and wanting a computer. They did have a choice to use pencil and paper or the computer when composing and writing stories or doing language arts assignments .

A student coming in the middle of the school year would have a difficult time. This class did get a new student in May. Todd did not know how to "touch type" or use the computer. Watching Todd was painful as he was at the "hunt and peck" level. It took him a long time to find each key and type his stories. He was more focused on "touch typing" than composing stories. The inclination to do it for him was very strong. I observed him one day to see how much he could type in an hour. He typed three lines. The other students were finishing their first page and some were on their second and third pages. Todd gained very little from using the computer. He found it very frustrating. With the help of staff and a computer keyboarding program, he did improve somewhat by

the end of term. Todd said, when asked how he felt about learning to keyboard,

> Todd: It was weird cause I didn't know anything about computers. Now I feel a lot better. I don't keyboard really good but it is coming.

The keyboarding instructor felt very strongly that one of the main weaknesses of keyboarding being taught to elementary students was an equity issue.

> Instructor: What happens to the student who really does not want to keyboard? That student may find it difficult to fit into that setting and how do they adjust to the setting?

Working with pencil and paper is also an equity issue as students are forced to use pencil and paper if there are no computers available.

Many of the students, even though very young, felt that they should know how to use the computers. Fifteen of the 27 students had computers at home. The 12 students who did not have computers at home said they wanted computers and they wanted Apples. Several students who said they did not have a computer at home went on to say that they had a Commodore 64 and could only play games on it.

> Cathy: It is only a game computer.
>
> Al: Mine is too. They are boring. You can't work on them.
>
> Roy: We only have an Atari but the space bar does not work. We can only play games on it, but we are going to get an Apple.

Karen: We have an Apple IIC and we use it for games. It is different from the computers here as we only play games with it.

CHAPTER 5

KEYBOARDING

I had reservations about elementary students being able to "touch type". A large keyboard and tiny hands did not appear that they would work simultaneously. This initial assumption definitely changed throughout the year.

The keyboarding instructor's initial five assumptions were: Students in grade two/three

1. can touch type.
2. require the same number of hours as junior high students.
3. could use the same sequence for introducing the keyboard.
4. could use a junior high text.
5. could be taught with methods used in other typing courses.

After the first week, the keyboarding teacher believed only one of the five assumptions. The first assumption that students could "touch type" proved to be true.

> Instructor: It was very disillusioning because everything I believed was not true. The only thing that I believed was true was that elementary students could 'touch type'.

A TYPICAL KEYBOARDING LESSON

On the drive to the school the keyboarding instructor and I would discuss the daily lesson and any weaknesses and strengths emerging in the keyboarding course. At this time of day, the morning rush-hour traffic was ended so the drive

to the school was anything but hectic. It was a time to collect our thoughts and examine what was accomplished.

We would arrive at the school a few minutes before nine, park on the east side of the school, enter the east door, and hang our coats in the staff room. Walking down the hall, a buzz of activity could be heard coming from the classrooms. Monday mornings the students would be in the music room for a school assembly. Other mornings they were in the classroom reading. Usually a student would be standing at the teacher's desk talking to her.

The teacher would instruct the students to go the computer area. They were reminded as to who was to go to the computers and who to the unattached keyboards. If the teacher made a mistake they would correct her. After these instructions were given, the students who were to go to the computers stood up and moved to their respective computers. Then the students who were assigned to the unattached keyboards moved to the tables in the computer area.

The computers were on two rows of tables. The unattached keyboards were on three tables arranged in a semi-circle facing the computer tables. When the students sat down some of them were unable to touch the floor so their feet dangled. They could not comfortably rest their arms at their sides. There were some obvious uncomfortable keyboarding positions.

As the students were locating their respective computer or unattached keyboard, the keyboarding instructor placed a transparency of the keyboard on the overhead projector. I would be placing their daily lesson in copy holders on their desks. On Mondays the lesson sheet had different stickers on the upper right-hand corner. These stickers were either colourful animals, birds, or flowers.

The keyboarding instructor asked the class to settle down and waited until they did. The overhead projector was turned on and the lesson commenced. There were two overhead transparencies. One transparency was of the keyboard and the other the daily lesson. The keyboard transparency was colour coded. Green was used for all previously taught keys, a second colour was used for reviewing the keys introduced the previous day, and a third colour was used for the two new keys. She started the lesson with a review of the keys taught the previous two lessons. The keys would be practiced as to correct fingering and placement in terms of the reach and in context of words and phrases. An exchange of transparencies then took place and the lesson would be placed on the overhead projector. The lesson corresponded to one handed out to the students. A paper would cover the lesson transparency except for the line being focused on for the first drill.

All the instruction was oral and visual. The keyboarding instructor would demonstrate by holding up and

showing the correct finger for the new key. The fingering terminology was for elementary students. She would illustrate which finger to use for the correct key: pointer, tall man, ring finger and the pinkie finger. The students would look at the keyboard and practice the reach. Then the keyboarding instructor would dictate the line and the students would read from the transparency and quietly vocalize the letters.

REVIEW

A typical lesson for learning new keys was on September 21, 1987, when the letters "e" and "u" were introduced. The lesson started with a review of the home row keys, "i", "r", and "h". Using the overhead transparency, the keyboard placement and the fingering for the home row keys was reviewed. As the Keyboarding Instructor called out the letters the students typed the letters: a;sldkfj. While the students were "touch typing" the keyboarding instructor, the teacher, and I were walking around checking on correct fingering and "touch typing" technique. The students then reviewed "i", "r", and "h" by keyboarding the following line: kik kik frf frf jhj jhj

NEW LETTERS

The new letter "e" was introduced. Using the transparency "e" was located on the keyboard. The teacher held up the "tall man" of the left hand to indicate the

correct finger. The upward reach from "d" to "e" was demonstrated on the transparency then anchoring the hand on home row. They practiced the new reach as the instructor orally paced the drill as the students read from the transparency and "touch typed":

ddd ded ddd ded ddd ded

The students typed the words "elk", "sea", "feed", and "lake". Before typing each word the instructor reviewed the reaches for the word, then orally dictated the line as the students watched the transparency and "touch typed". The keyboarding instructor orally dictated the following lines:

elk elk elk

sea sea sea

feed feed feed

lake lake lake

Errol told me that he definitely had to "touch type" as he wanted to type out his birthday invitations. He turned to Warren and said, "You will get one too as you are coming to my birthday party." The instructor, the teacher, and myself continued to walk around checking and helping with technique.

Fifteen minutes had passed so it was time for the students to exchange places between computers and unattached keyboards. The exchange was done in a very orderly manner.

As soon as the class was settled, the keyboarding instructor introduced the new letter "u". She demonstrated

on the transparency the location of the key, visually indicated the "pointer" of the right hand, and demonstrated the downward reach using the keyboard on the overhead transparency. The line was orally dictated and paced as the students read from the transparency: jjj juj jjj juj jjj juj

Before each of the following lines were typed the keyboarding instructor reviewed the key location of letters of each word and orally dictated each new word:

us us us us

use use use

full full full

duke duke duke

DRILL LINES

The students concluded the lesson by typing the drill lines:

he has a sled

she has a sled

Once finished, they saved their file and moved back to the classroom area to await instructions for the next class.

PHYSICAL ASPECTS OF KEYBOARDING

ATTACHED VERSUS UNATTACHED KEYBOARDS

The students spent 15 minutes of the 30-minute class on the unattached keyboard and 15 minutes on the computer keyboard.

Teacher: The students did not respond the same to the stand-alone keyboards as they did to the computers. When they knew that their stories would be saved onto a disk they were more enthusiastic.

Initially when working on the unattached keyboards the students were enthusiastic. However, as they continued to work on the drills their attention to fingering technique did not always last for the 15 minutes. The students on the attached keyboards could sustain their attention for proper fingering and technique longer. Being able to see instantly how they were doing on the screen provided motivation to continue.

IDENTIFICATION OF CORRECT FINGERING

After all the alphabetic keys had been taught, the students were given a finger identification exercise. A sheet of paper illustrated two hands. The students were asked to print the letters of the alphabet on the fingers they used to type the letter. Some would place a particular finger on the keyboard and then determine all the keys that finger used. They recorded it on their paper. Others went through the alphabet from A to Z placing both hands on the keyboard. They found the letter by tentatively keyboarding, jotting it down on paper. They then went to the next letter of the alphabet. Some finished in a matter of minutes. Some took the full fifteen minutes to do the exercise. The

students were able to identify the correct fingering with very few errors.

THE ENTER/RETURN KEY

The students' hands appeared very small on the keyboard. Would there be problems reaching the enter/return key without taking their fingers away from the home row keys? The students had little difficulty. They could strike the enter key with the "pinkie" with the other fingers close to or on the home row keys.

TOUCH TYPING

The alphabetic keyboard had been taught by the middle of October. The students generally displayed "touch typing" techniques. They used correct fingering, proper hand position, good posture, and correct striking of the keys. The keyboarding instructor felt, "The transition of reading from the overhead to the xeroxed lessons created problems." Instead of reading their copy, many tended to keep their eyes on the monitor while "touch typing"! A few watched their fingers, but most students keyboarded without looking for the keys. This was not always true when they edited their stories or writing assignments. During editing they tended to use the "hunt and peck" method.

Susan: We don't know how to use the edit key because the keyboarding instructor did not show us how.

Most of the students could "touch type". In June the teacher commented,

> Teacher: Some of the students are touch typing all the time. Very seldom do they look except for letters like "z" and "q" that they do not use very often. There is still that glance to the keyboard but for many of the children really don't look at their hands at all. There are still some of the students who do glance down at their hands occasionally as they go along. There have been a couple of cases where there have been children who have missed school or one who had a cast on her arm for quite sometime. She still looks at her hands quite a bit, but I think these students are definitely a minority. If they lose their position, they will check and revert to the proper hand position on the keyboard. However, if the students are using the computers for language art stories, they "touch type".

The keyboarding instructor was surprised at how well they keyboarded,

> Instructor: I am just amazed how well they use the computer for their writing. Because they are writing they are more conscious of the detail of the word as they type letter by letter and I suspect it must make them more conscious of things like spelling.

Students worked differently for mathematics than they did for language arts. Some of the math programs require only one or two key strokes so the students did not use touch typing when working on these programs.

PALMS ON KEYBOARD

There were several problem areas in the actual physical aspect of keyboarding. They rested their palms on the keyboard with their thumbs underneath the keyboard. This may have been the reason for some of the difficulty with the reaches. It took considerable coaching and encouragement to have them keyboard with their palms above the keyboard and their thumbs beside their "pointer" or index finger. Eventually, all the class typed with their palms off the keyboard.

MIDDLE AND INDEX FINGERS

For the first few weeks the students appeared uncoordinated and their concentration tended to be short. Some of the keyboard reaches appeared difficult especially the reaches using their middle and index fingers. To make an upward reach they tended to use their middle fingers. Many had difficulty with the horizontal reach from "f" to "g". For downward reaches many tended to use their index fingers instead of their middle fingers for the "c" and ",".

The problems with the downward and horizontal reaches were most evident from September 20 to the end of September. By the first of October they were keyboarding using the index and middle fingers on the correct keys. There were definite problems with interchanging the use of the middle and index fingers but not for the reaches with the other fingers.

SHIFT KEY

Occasionally a lesson did not turn out as planned. The introduction of the shift key was one lesson. The introduction of the shift key was delayed until all the alphabetic keys had been taught. This lesson was one of the most interesting lessons experienced. The shift key is pressed with one hand as the other hand strikes the letter on the keyboard. The students wanted to use only one hand. They pressed the shift key with the little finger of the right hand while also trying to type the letter "k" or "j" with the right hand. It was difficult to do. Consequently, they would use the little finger for the shift key but any finger of the same hand for the key. Through guided practice, by November 9, every child in the room was using the shift keys correctly.

When they found an aspect of keyboarding to be difficult they would quit working or complain. The introduction to the shift key brought about several negative comments. It was common to hear the statement, "I'm bored."

Bill was having trouble holding down the shift key with his little finger. Our dialogue follows:

Myself: I had the same problem when I learned to keyboard, because I have short fingers like you. If you keep practicing, you can do it.

Bill: You didn't do this like us!

Myself: Yes, I did but I was not as lucky as you are. I could not use a computer.

Bill: How did you learn?

Myself: I had to learn to keyboard on a typewriter.

Bill: Was it an electric typewriter or one of those old machines?

Myself: One of those old machines.

TIMED WRITINGS

The first timed writings were given on September 30, after 6 1/2 hours of instruction. There were one-minute timings on groups of two, three, and four letter words and sentences. The syllabic intensity of the timing was 1.0. Half the class printed the words using a pencil on paper. Half the class keyboarded the words. The timing portion of the lesson on September 30, 1987, follows:

as as as of of of

is is is if if if

---

has has has lad lad lad

jar jar jar sir sir sir

---

fall fall fall feed feed feed

card card card milk milk milk

---

chet has a sled

....1....2....3....4....5....6

Each section was timed for one minute. After 15 minutes, the students printing showed signs of fatigue while the students on the keyboards wanted to continue. When the timings were done, the students on the computers exchanged places with the students who were working with paper and pencil. The timed writings were done again.

Six students keyboarded faster than they printed. Four printed at the same speed that they keyboarded. The remainder of the class keyboarded slower than they printed. Their keyboarding rates ranged from 3 to 24 words per minute. Their handwriting rates ranged from 3 to 17 words per minute. The average keyboarding rate was 9 words per minute and the average handwriting rate was 11 words per minute.

They took a second one-minute timed writing on November 4, 1987, with their monitors turned off. They now had 15 hours of keyboarding instruction. Both keyboarding and handwriting rates ranged from 3 words per minute to 20 words per minute. The average keyboarding rate was 10 words per minute and the average handwriting rate was 13 words per minute. Every student could type as fast or faster than their handwriting rates.

A third one-minute timed writing was administered on December 9, 1987, after 21 1/2 hours of instruction. Two timings used words and two timings used sentences. The average keyboarding rate for the class was 14 words per

minute. The rates ranged from 6 words per minute to 24 words per minute. Handwriting tests were not given as every student could type as fast or faster than writing.

Another one-minute timing was done on April 12, 1988. This timing consisted of the following four sentences:

Their desk has a good view of the hills.
Their desk has a good view of the hills.

Chris is to fix the sign for the school.
Chris is to fix the sign for the school.

She will take all of us to the new show.
She will take all of us to the new show.

Anna will ask about the new video game.
Anna will ask about the new video game.

The keyboarding rates ranged from 9 words per minute to 32 words per minute. The average rate for the class was 16 words per minute.

The final one-minute timing was done on June 17, 1988. Twenty-three students did the timing with an average rate of 18 words per minute.

TABLE 1

ONE-MINUTE TIMINGS

Words Per Minute	H*	T**	H*	T**	T**	T**	T**
30-32						2	2
28-29						0	1
25-27						2	1
21-24		1			2	2	7
18-20			4	1	4	4	1
15-17	3		4		5	9	7
12-14	9		10	12	5	2	1
9-11	10	15	3	6	6	3	1
5-8	2	6	3	8	4		2
3-4	1	3	1	2			
Median WPM	11	9	13	10	14	16	18
Instruction Hours	6 1/2		15		21 1/2		
Administered	9/30/87,		11/4/87,		12/9/87,	4/12/88,	6/17/88

*H stands for handwritten
**T stands for typewritten

REVIEW

The alphabetic keyboard was taught by October 19, 1987. Now the lessons changed. Review of the alphabetic keys was still done. Other keys were taught such as the period and the shift keys. The children were taught how to

horizontally center so they could draw a ghost for Halloween, work on poetry, and keyboard a Christmas tree. See Appendix A for ghost, Appendix B for poetry, and Appendix C for Christmas tree. A review of the keys would be done in every lesson but a language arts component was predominant. A great deal of word building, finding opposites, and categorizing items was done. For word building the students would be given two letters and they had to think of as many words as possible that contained the letters. For example: they would be given "fl" and they had to think and keyboard other words containing "fl".

The first part of November was spent reviewing the letters of the alphabet. The keyboarding teacher would call out a letter of the alphabet and the students would type two of the letters plus a space.

aa bb cc dd ee ff gg hh ii jj

kk ll mm nn oo pp qq rr ss tt

uu vv ww xx yy zz

She would then have them turn off their monitors or close their eyes and do the same drill. They always stayed on task for this drill.

They would be given a sentence starter such as, "At recess, I like to" and they had to complete the statement. They were also given sentences that they had to keyboard and fill in the missing vowels.

Example: M-et m- -t th- sh-w.

W- ar- gl-d th-t y-u c-n c-me.

Graduated timings were introduced. The students were timed for 12 and 15 seconds. The aim was to complete the sentence in the amount of time given. The students enjoyed doing these timings. They would shout as soon as they completed a line. Following is a graduated timing given on November 27, 1987:

	20 seconds
We wish to go there.	12 words per minute
The man cuts the hay.	13 words per minute
Please come to see us.	14 words per minute
He owns a herd of cows.	15 words per minute

After Christmas, I taught a weekly review lesson. It was important to make this review lesson fun. The class quickly lost interest if only drills lines were done. Games were employed to review the keyboard and keep interest. The first game was a football game. The students scored a touchdown every time they typed a drill line. They recorded their touchdowns on a game sheet. One little boy commented, "Boy, is this ever neat."

CHAPTER 6

WE HAVE THE TOOL: NOW THE WORK BEGINS

CHANGE IN FOCUS

From January, 1988, to June, 1988, the focus changed from "touch typing" to using the computers as a "writing tool" in language arts.

Students used the whole machine in earnest. They loaded and retrieved, edited, saved, and printed their files. They also became very proficient at using the various function keys. They could set margins, centre, justify, rename, and double space their work. The students knew how the teacher expected their work to be formatted as illustrated by John's remark after printing out one of his stories, "Am I ever a dummy! I have to double-space my story." Appendix E for language arts work done after Christmas.

RELATIONSHIP WITH COMPUTER

EXPERIMENTATION

The students discovered that if they used the open apple key with other keys the computer would do different operations. They experimented. On October 16, they discovered that if they pressed the open apple key and the "n" key a different prompt would appear at the bottom of their screen. Luckily they had not keyboarded anything at the prompt or they would have changed the name of their

file. When the students experimented, the teacher was usually out of the room.

Many times, by trial and error, they figured out a function key. One day when watching the students, I noted that Orville and Al had discovered how to use the open apple and "d" keys to delete segments of their stories.

During Halloween the class keyboarded a mystery art picture. They worked in pairs and there was much discussion as to what the picture would be when completed. They discovered very quickly by moving the cursor key to the bottom of the screen they could make the picture, a ghost disappear. It was an appropriate action for a ghost.

EDITING AND THE DELETE KEY

The students found and used the delete key to correct errors without being told where it was or what to use it for in "touch typing".

> Teacher: When they are writing stories they try to make them perfect, consequently, they do a lot of correcting with the delete key.

She felt that more emphasis should be placed on the students learning to keyboard without the use of the delete key. Rather than focus on proper fingering they were more conscious of errors that were made. As soon as they made an error they used the delete key to correct the mistake. This tended to take away from the continuity or flow of the keyboarding. The delete key could be used but after the

entire story was keyboarded. Initially they should concentrate on keyboarding their story rather than editing. Editing was to be done when the story was completed.

In November the teacher was pleased with the progress made in the keyboarding.

> Teacher: I think the main difference is in their attitude and certainly it has improved tremendously. When they first started keyboarding it was just exercises, short words, and short sentences. There was not always a great deal of meaning to it so they did not stick to doing their lessons. Now when I put them on the computer to compose a story many of them will sit and work without interruption for quite a long time. Many of them will sit for at least 15 minutes without really ever stopping to look at anybody else in the room when they are at the composing stage. When they get into editing and so on it is definitely different.

EDITING

The students needed help when editing. They would "touch type" their stories and then immediately call someone to help them edit. I found myself poked and pulled at for help. I was saying, "You will have to wait until I have helped Jim, Fred, Lucy, etc."

Initially, I would go through their sentences with them. If I left to help another student, students would have very little or none edited when I returned. Sometimes, they would be on the same sentence. Relying on someone else

to help them eventually changed. Towards the end of May and beginning of June it was common to look at a student's work and see very few errors. See Appendix D of completed and edited work. One day the students were to print their stories on the printer. Kathy became very upset as her story was printed and she had not had time to edit it!

Kathy when asked if the computer helped her to write said,

> Kathy: It is easier to correct with the computer. You can put in words if you forget them. You can move lines down and put in more lines. You can make more copies easier.

Not all students felt editing was important. One day John asked me to help him edit. When I looked at his work, he had one sentence 20 lines long. I told him he needed some periods. If he were to read it without any pauses, he would run out of breath.

> John: That's okay, I am not going to read it. Someone else will read it.
>
> Myself: I do not feel like running out of breath when I am reading your work. Let's put some periods in it.
>
> John: I don't know where to put them.

We went over his story and inserted periods where needed.

The students freguently helped each other edit. It was not uncommon to hear a student telling another student how to correct a misspelled word.

SPELLING AND LANGUAGE ARTS

Whenever the students composed stories they asked either the teacher or myself how to spell various words. They would not call the teacher or myself over to the computer. They would walk over to where we were and inquire about the spelling of a certain word. On February 15, 1988, Fred asked how to spell "stream". He was told. He went back to his desk, got a scribbler, came back and asked me to write "stream" on the back of his scribbler.

Donald had trouble with spelling. He was always correcting spelling errors. It was common to see Nat helping him edit his work.

This same day Ann read Naoni's work and informed me,

> Ann: Naoni has spelled teacher 'tcher' about four times in this letter!!.

In November the teacher felt there was a definite improvement in spelling.

> Teacher: I do not think there is any doubt about the fact that improved spelling comes along with keyboarding. When they do their keyboarding they type words over and over during the drills and when typing their stories they make a conscious effort to use the spelling vocabulary for the day. When doing their spelling lists on the computer they will set them up in columns type them five times. All this is done without a request to do so.

The teacher believed they could see their errors in spelling much quicker with the computer compared to when they wrote

with pen and paper. In June, she still thought that the computers helped the students with their spelling. "Spelling has improved dramatically." She was not certain as to the reason for this improvement. The class was weak in spelling in early testing at the beginning of the school year.

> Teacher: When I did the early testing this is one of the weakest groups in spelling that I have had in a number of years. I have seen a dramatic improvement even on standardized tests in their spelling. The test given was a Public School Board test. Over the year in grade three they are expected to improve. When you give the same test again at this time of year you would expect the same percentile scores if they had made the regular improvement that should have taken place during the year. These children have done more than that and some of them have improved as much as 50 percentile points. It is amazing that they have not just maintained the same percentile score by learning the usual grade three work but have made dramatic improvements. It is interesting that there are a couple of children that have not shown much improvement. Almost all of those had poor keyboarding skills. The ones that have strong keyboarding skills show the most amount of improvement except for the children who are already high.

In her opinion keyboarding definitely affected spelling.

ACHIEVEMENT TEST

The students progress in language arts and math was monitored for the 1987-88 school year. They were tested by a university professor in September, 1987, and May, 1988. The school was compared to two control schools within the city. The control groups did not or very rarely used a computer.

> Tests of creative writing, reading comprehension, mathematics concepts, and basic facts were administered to the ... ACI (grade 3) students in September and again near the end of May.[78]

The students were given two creative writing tests because of their preference to do one on the computer. The teacher said the students had made significant gains on the test and she felt the computers were instrumental in the increase of scores.

The university professor commented,

> On the writing portion of the test the means for your grade 3 students (N=22) rose from 13.3 in September to 18.4 in May...The mean for your students on the READING COMPREHENSION portion of the test rose from 11.5 in September to 17.6 in May...The data that I have collected seems to lend some tentative support to the hypothesis that extensive use of the computer on an integrated basis positively influences achievement in the areas in which the computer is integrated.[79]

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78. Cathcart, W. George, Brief Report of Research Conducted in the Malmo ACI - 1987-88, University of Alberta, 1988, pg. 1.

79. Cathcart, W. George, "Grade 3 Language Arts and Mathematics Achievement Results---Malmo", University of Alberta, May, 1988, pg. 1.

Following is a table summarizing the students scores in language arts from the research compiled in May, 1988:

TABLE 2

SCHOOL MEANS ON MAJOR MEASURES[80]

School	Writing		Reading	
	Pre	Post	Pre	Post
Control 1	14.1	12.1	11.4	13.8
Control 2	13.8	14.8	14.2	17.3
Apple Computer Group	13.3	18.4	11.5	17.6
Word Processing		17.7		

The students in the Apple Computer Group had made significant gains in the language arts area.

COMPETITION

The competition level among the students was high. It was common to hear the students comparing how much or how fast they had keyboarded. On March 1, 1988, Manfred and Laura were doing just that. They had keyboarded exactly the same amount of lines of drills. I said, "Let's see what happens now that Manfred is on the unattached keyboard." Their eyes lit up and they proceeded to get ready for the next drill. Manfred still keyboarded the same amount as Laura. He very seldom looked at his fingers or the monitor,

80. Cathcart, W. George, Brief Report of Research Conducted in the Malmo ACI - 1987-88, University of Alberta, 1988.

but always kept his eyes on copy. Listening to a conversation on March 2 between Doug and Enid was indicative of the competition factor.

Doug: I have a typewriter at home. My grandpa lent it to me. My Mom used to be a secretary but now she is an engineer but boy can she ever type fast. I can type fast too.

Enid: I can type fast too.

She then proceeded to show us how she "touch typed" using any finger for any key.

Doug: The only problem with your typing fast is you can't read it.

Al and Manfred were constantly competing against one another.

Julie: It is easier to write with the computer. I can keyboard faster than I can write.

Manfred was sitting next to her listening. He agreed with her that it was easier to write using the computer. "I can type faster than you." He then asked me, "How fast does Al type?"

Competition even showed up during the student interviews. I asked Naoni how she felt about the computer in the beginning compared to the end of term.

Naoni: It was exciting It was better when we got stickers. I liked it when Dr. Ubelacker turned on the monitors and showed us how to keyboard. Now it is lots better because we only have one person for keyboarding I am better at doing keyboarding. Look how much

I have on your paper. I have the most.

The keyboarding teacher tried to stay away from competitive drills but the students would naturally incorporate competition into the keyboarding lessons themselves. They would "touch type" and then compare how much the person sitting next to them had keyboarded.

Timings brought out strong competition. When timed they would see how quickly they could finish lines. Some raised their hands to say they had finished almost before they were told to start.

Even when a conscious effort was made to eliminate competition, it was still evident. One day I heard the following conversation between Jim and Georgina.

Jim: I am the best typist in the room.

Georgina: No, you aren't.

Jim: Oh yes I am. I have typed the alphabet five times in only a few minutes.

When I looked at his work, he had typed the alphabet five times!

They, also, became very excited when they were able to type graduated sentences. These sentences were to be typed for 12 or 15 seconds. The aim was to type each sentence within the time allowed. Even the normally quiet children would shout out to the class when completed. Following is an example of a graduated drill:

GRADUATED DRILL

	15 sec.	12 sec.
Be a good loser.	13	16
The game was fun.	14	17
Put the top back on.	16	20
Do not ask about her.	17	21
Be sure to vote for him.	19	24
The girls liked the cake.	20	25

It was evident that the students were aware of their abilities and placement in the class. One day Pere was upset with Charles because he was helping John with his math.

> Pere: John is 20 pages ahead of where he should be. That is because Charles is helping him. It is not fair. I am so far behind. I am only in second place.

The teacher often asked me to help Donald as he was a slow reader. Every time I would help him with his reading he would comment, "I have trouble reading."

After doing a timing one day, I asked Ann how she had done on her timing. She said, "I did terrible."

I asked her, "Why?"

She replied, "I did not type very many sentences."

PERSONAL ASPECTS

The students enjoyed stickers, keyboarding their own names, and writing sentences that applied to their personal

situations. Their keyboarding was affected if they were tired or if something exciting happened that day, either at home or in school. During keyboarding class their main focus was not always on the computer. If they had received something new, they would either be studying it or telling their friends or myself about the item. When Nicole received earrings for her birthday she informed me, "These earrings are 12kt gold, but I have lost one."

STICKERS

On Mondays the keyboarding teacher took stickers to the school. She put the stickers on their lesson sheets. There would be much excitement. The students would make individual requests for certain stickers. Time was spent dispensing and trading stickers. If they received a sticker they disliked, they would then spend time bartering with other classmates for the sticker of their choice.

The stickers that they received during the year also brought forth personal responses. One day they received cat stickers.

Fred: I have the best cat. It even has a mouse.

This was a surprise! I had looked at them as I passed them out. There had been no mice on any of the stickers!

Georgina: Your cat doesn't have a mouse--your computer has a mouse!

The animal stickers brought forth such comments as: "I have eggs to type with because I have a hen sticker.", "I have to type with yogurt because I have a goat sticker.", and "I must use dairy products as I have a cow."

PERSONAL EXPERIENCES

Students gave reasons for not using correct fingering. On March 1, 1988, Jim was using any finger that happened to be handy for the keyboarding drills. He was asked why.

Jim: Roy is not using the right fingers.

Myself: Roy is using the proper fingers for his right hand. He is not using the proper keys for his left hand because it is broken.

Jim: But I got hit in the ear by a soccer ball this morning.

Myself: I am surprised that the soccer ball has affected your keyboarding.

Jim: Well, it does, and that is why I am not using the proper fingering.

There were days when individual students would not keyboard but just stare into space. Their reasons for not keyboarding would be "I'm too tired." or "I'm bored." If they did keyboard, it would not be with good "touch typing" techniques. The following day, these same students used correct techniques without any difficulty. They were not predictable!

The week after Halloween was a difficult week. The students either did not "touch type", or they "touch typed"

poorly. Did all the Halloween candy have anything to do with the malaise?

The students would take directions very literally. If told to practice a drill, they would type only the line on the lesson sheet. They would not practice the line again. When encouraging a student to practice the line again, it was not uncommon to hear, "I do not need to do it again. I can practice it over at home on my own computer." or "Why should I type it again? I have already finished the line in the lesson."

They knew that they could use the "touch typing" skill for personal items. Errol, early in the term, said, "I am going to type my invitations for my birthday. I am going to have to know how to do this. My birthday is in November."

The students liked to demonstrate what they were doing. If anyone asked them to show how they used the shift key, they would promptly illustrate the proper technique. Many times they would call me over to show me what they had done. If they had keyboarded a list of words they would have to make sure that I knew how many they had keyboarded.

The students were very adamant about the usefulness of the computer. They perceived it useful for making up invitations for their friends, and writing stories and poems. More than half of them had computers at home. When asked what they used the computer for they replied that they

used it for games. One student said, "I don't work on our computer, I only play games."

RELEVANT MATERIAL

The class worked well when they could relate to the material. The introduction of their names into the keyboarding lessons caused much excitement. They would inform the keyboarding teacher that she must teach them the other letters of the alphabet so they could all "touch type" their names.

The length of the drill lines affected how they worked. All the students worked on short words but occasionally became weary on long sentences. During drills with sentences it was unusual to see someone just sitting and doing nothing. If they typed sentences with their names in them or if the sentences were about something that interested them, they would "touch type" it well. One sentence, "Lyall has a black belt.", brought about a great deal of discussion. The class found the sentence amusing. Such chuckles and comments as, "Lyall does not have a black belt; Warren has the black belt." could be heard. Warren did know how to do karate.

The day they labelled the diagram of the two hands brought forth some personal questions. They wanted to know whose hands were in the diagram. Were they the keyboarding instructor's hand? When I told them that the hands were the

keyboarding instructor's hands, they were quite happy to go back to work.

They enjoyed word building exercises and graduated sentence drills. It was common for the students to suggest the keyboarding activity for the day. When reviewing the letter "h", Laura and Jane asked if they could do a drill of words that started with the letter "h". They did just that! When given the letters "me", they had to think of words that contained these two letters. They would shout out the words that they knew. Everyone got a chance to volunteer their word. They would then "touch type" them enthusiastically.

This personal aspect of keyboarding was not always positive. One day when typing the sentence, "Ricky aids a dog in the drain." Ricky refused to keyboard at all. When asked why he said, "I can not type this sentence. It has the word "aids" in it." The keyboarding instructor and the teacher tried to explain to him that the sentence was acceptable. He was told that the word aids could be used in different ways, for example, "aid can mean to help a dog." This did not encourage him to continue "touch typing". In fact, nearly all the class had quit "touch typing" by this time. It was one of those days when I was happy to leave the setting.

PENCIL AND PAPER VERSUS COMPUTER

On January 21, 1988, the students were to compose a story. When the teacher told the students they could

compose their stories on the computer or they could use paper and pencil, only one student chose to use pen and paper.

Twenty-six of the 27 students interviewed said that computers helped them write. More than half the class said that the computer helped them to write faster and it was easier. The one student who said computers did not help was Moira.

> Moira: Not me as I can't keyboard very well. I can't keyboard well because I have a mouse at home that I use.

There was another explanation why Moira "touch typed" poorly. At the beginning of term she had broken her arm. Consequently, when the other students were learning most of the keyboard, Moira was doing only one-hand drills. At that time she would complain about not doing what the other students were doing. She did not practice the one-hand drills very much.

Ann felt that it was easier to use the computer because of the speed. She had been in an Atlantic province the year before.

> Ann: In my old school I used to hunt with only two fingers. It was faster that way but now I can't just use two fingers because I am used to using all my fingers. It is also easy to correct when using the computer.

Using a pencil and eraser came up many times when explaining about writing with pencil and paper.

Ned: If you don't have an eraser you can't correct your mistake when you write.

John: You don't have to go all over and hunt for an eraser and stuff so it is easier to use the computer.

Orville: The computer prints neater. I can write faster than I can with a pencil. I don't like it though when the computer squeaks. When we first did keyboarding it was harder.

The students would remain with the computers longer when composing and writing stories than they did when using paper and pencil.

Teacher: These children are very good at writing down long stories and some of them have said to me that their hands don't get tired like they used to when using a pencil.

Many of the students felt it was easier to make corrections on the computer. When Laura was asked if computers helped her to write, she had to show a picture from her story book of a crab with a gold piece in each claw first. She was intrigued with a crab being able to find gold pieces. It was more important than the question. Maybe the computer had become only a tool. Why bother with the reasons why it might make writing easier if you already know how to use the machine?

Laura: The computer helps me to write neater and faster.

Enid: The computer helps me to write. If I did not know how to keyboard, I would have to hunt for the key to press. By knowing the proper key I can type faster.

Doug: "Of course it helps! I wouldn't be able to write without knowing the home row keys, and all the directions such as saving a file." While talking, he was looking for a file. He found the file and said, "Someone keeps putting files on my disk. It must be a mystery person.

Teacher: Keyboarding was the crutch we needed to use the computers effectively for language arts. If we didn't have it, it would have been tremendously slow for the children to enter a story.

The students edited a great deal when they composed stories. The teacher felt they edited more on the computers than they did when they wrote stories with pencil and paper. They liked writing and their stories tended to be longer when using the computers.

OUTPUT OR HARD COPY

Students who wrote very little when using paper and pencil would write for longer periods of time when on the computer. Some of them were impressed with the lengths of stories that they could write.

Teacher: If they could get on to the second and third page of the paper it was pretty exciting for them.

Some, however, felt that they were not writing very much because of the compactness of their writing on the computer. Printing out their stories helped to show them that they actually had written a considerable amount.

The amount of writing increased after the students printed out their stories. Seeing the hard copy was an inspiration to write more. It was not uncommon to hear such

statements as "I want my screen to be full." or "Oh boy, I have printed two pages of story." Vincent printed out a story in January that was two pages long. He was hopping up and down with excitement that he had a two-page story.

Fred commented about his story, "I am going to fill this entire screen."

They liked to have a printout as illustrated by a comment made by Jim, "I will make two copies as I want one for myself."

When watching Janne working on a poem on February 9, 1988, she informed me that she had written many poems last week, but her delete key stuck so she wiped out all her work. I asked her if she was ready to print out her poem. She replied, "No, I want a whole bunch of poems rather than only one."

PARTICIPANTS' VIEWS ON ELEMENTARY KEYBOARDING

GENERAL VIEWS

The views voiced by students, adults involved in the project, and the community were very positive. There were few negative comments.

The principal was very adamant that the quantity and quality of the writing was exceptional for a grade three class.

> Principal: Keyboarding should not be learned for the sake of learning keyboarding. I think power is the operative word for me. I think

> children who know how to connect a finger to a key and see that translated onto the screen in nice bold printing, that is a very powerful tool for children. I see it as expanding a repertoire enabling them to write as fast as they think. Normally in writing, because of their fine motor skills and labour of working with a pencil for some children, not all mind you, it effects the quality and quantity of writing. What I am seeing this year is the quality and quantity of writing is exceeding anything that I have seen in an average or typical grade 3 class.

The students response to what they liked about computers was not a surprise. Games was the winner. Sixteen out of 26 interviewed said they liked to play on the computers. Twelve said they liked to write stories on the computers. Two students summed up the positive comments for the class.

> Laura: I like typing. I like the way it comes out, it is so neat. You can print your work and take it home. You can play games on the computer. We get to write stories and poems and do math on it. We do lots of work on the computer.
>
> Roy: It's competitive by things you can do on it. They are nice to use because you don't get tired of them. I like them. They are fun and neat.

Seven of the students interviewed said they liked all aspects of computing.

What they liked least about the computer was the mechanical aspect. They disliked switching disks or loading the programs. Many of them felt it was too slow.

Dan: I don't like the time it takes to load sometimes and I don't like the directions that tell you to put in your data disk or your program disk.

Fred: I don't like them because when you trip over the cord you can lose your whole program. That happened to me. Someone tripped over the cord and my whole disk was gone. I don't like the beeping either when you do something wrong.

Al: I don't like that it takes so long to save and if you are just about to save and someone walks by your desk and steps on the cord you will lose your whole disk. The beeping gets you into trouble too. I don't like it when it takes a long time to boot up.

Charles: I don't like the computer cause sometimes it can break easy. If you rub your feet on the floor, the computer can break from the shock. If you have problems with the disk it is hard to get back and if you get it back it is not the same. They cost a whole bunch of money and if they break you get really upset.

There were mixed views about the initial aspect of learning to "touch type" on the computers. Nine of the students felt it was hard learning how to keyboard.

Cathy: It was hard to learn with both hands as I was used to using only one finger for all the keys. It is easier now because I use all my fingers.

Roy: It was very boring. Just kidding. It was sort of hard. We weren't very good at it. We just learned how to use the keys. We didn't know where the keys were. Now it is easy and competitive. It's easier to type than write.

Julie: I felt like I wouldn't be able to do anything and I didn't like it because it was hard to do. I like it now. It is easier to type to write stories. It is easier because I know the keys.

There were mixed feelings about the computer by the teacher. It certainly was not a solution to all her problems.

Teacher: I have to admit that it probably has caused as many problems as it has solved. At this point I could do much more if I had a computer for every child. Having only enough computers for half the class has presented many, many difficulties for me in what I want to do. My class has been doing some really nice work with the computer. I find I am still every bit as busy and still every bit as much in demand and needed and still very much in control of what my children are learning. The computer is not a replacement for the teacher. It is used as a tool to improve the quality of work of the children and not necessarily to reduce the load of work of the teacher.

The principal did not see the implications of elementary students using computers initially.

Principal It wasn't, I guess, until about January or February that I started to see the implications in terms of the school...For this school with 200 children I'll tell you

> what I think the ideal is. I believe we need a computer on every child's desk for two years. For those two years it would be at the grade 3 and 5 level. There would be access to all children in the other grades. I am really sold on the keyboard training. I think keyboarding should be taught, can be taught painlessly, and I view it as a life skill. I can't see children being without keyboarding skill in this day and age.

The principal noted that the response from the community initially was not all that positive. Concerned parents were anxious that their children would be stuck in front of a computer all day. They did not want their children to be taught by a computer but felt that it was important there be a teacher involved in their learning also. Invitations were extended to the parents on many occasions to observe what the students were doing on the computers. They were able to see first-hand the excitement and total involvement of the children.

The teacher noted that the response by the parents and community had been excellent.

> Teacher: I have sent out booklets of the students' work throughout the year and the response has been very positive. As is the usual case there have been some parents I have not heard from at all but I am sure if they were unhappy, they would have given me their negative feedback."

She sent out a written survey to the parents in June, 1988. Of 24 parents who responded 20 felt that their child enjoyed

working with the microcomputer. Fifteen felt that their child had learned more and six about the same on computers as they would have learned in a classroom with few or no computers.

When asked for specific things that the children had learned on the microcomputers some of the parents' responses were:

- His spelling is improved. Sentence structure is better.
- Keyboarding; editing work; how to use the computer; cooperation in the use of equipment; various independent projects.
- Punctuation and paragraphing. However, this also might have been taught in the normal classroom. The computer does make it easier to correct sentence structure by the child. Thus it does not frustrate the child.
- greater editing skills; more attention to detail (grammar, and punctuation).
- does not emphasize cursive writing (a weakness), therefore negative toward writing exercises; when dictation of words are involved in keyboarding exercises, if words are not known, then keyboarding is slow and frustrating. In other words for efficient keyboarding, some level of reading appears prerequisite.
- particularly in developing his writing skills. His handwriting is very awkward, due to poor fine motor coordination. Because of that he gives up writing, while with computers he is much more prolific, expressing himself freely. Also allows him to change and correct composition.

The students were asked what their friends and family thought about them using the computers or knowing how to keyboard. The general response was both family and friends were pleased the students were able to use computers.

Manfred: My family thinks it is great. My Mom wants to learn. I tried to teach my Mom but it didn't quite work. I don't know about friends as they are all in this classroom. The only friend that I have out of this room thinks it is great.

Doug: My family really appreciate it. It is really good. They appreciate me using the computer. Before I did not know anything--this is a big challenge for me. Now I can type 12, 13, and sometimes 20 words per minute. May I ask you something?

Myself: Yes.

Doug: Are you a reporter?

Myself: No.

Doug: Oh, thank goodness. I thought I might be on Oprah Winfrey. Probably my Mom likes me using the computer because she is a secretary in a company. I may get as fast as she is.

Only one student said that her family disliked her using a computer.

Roberta: My Mom and Dad don't want me to use the computer because they would rather me use paper and pencil. They think people my age shouldn't be using computers nearly all day. I don't know about friends except my classmates and they like it.

The response of the school staff to the project had been positive. The teacher of the project did many inservice sessions and some of the staff attended these as well as other sessions in the city. The principal went on

to add, "Many of the staff are using computers and of our staff remaining on for next year there is not one person who is not using the computers to some degree."

Knowledge and Awareness of Computers by Students. The students handled their disks, loaded their machines, and labelled their files easily. Their use of the computers was impressive.

These students' actions were always a surprise. One day Manfred and Laura's were arguing. Manfred was unhappy with Laura for ruining the computer. She had tried to save their file, but had never used a dual disk drive before. The problem was she had not put her data disk in the extra disk drive and so had not saved the file. Manfred could not find the file on their data disk so assumed that she had ruined the computer. They were shown how to save the file using a machine with dual disk drives. Laura said, "I always save my files twice just to make sure that I don't lose them."

Their descriptions of the computer were fascinating.

Al: You type with them. You can play games. They are expensive. They use electricity. They don't turn off automatically. They have micro chips in them. They need lots of equipment such as disks. You can hook up the monitor by yourself. Sometimes the monitor falls off.

Julie: There is a keyboard with lots of little squares which are keys. The monitor is on top and is square. There is a switch on the

back for turning it on. When you press a key it comes on the monitor. One side has a disk drive which is attached to a keyboard and monitor. These little disks have a hole in them where information goes. Programs and games are on disks.

Doug: Well, it has different programs you can do. It's a button on the side so the screen will come on. Also there is a little slanted equipment down under the monitor which is the keyboard. Somewhere is the disk drives where you put disks with programs and games. The disk has programs which you boot and you put your files. There is a jacket to protect the disk as the disk is really delicate. If you touch it, it won't work. Keys are what you type with on the screen like a typewriter. There is a round hole in the disk that you can adjust when it is not working. I don't know how to do it but our teacher is very good at it. Everything is made out of computers. I can't say the table is but they are designed using computers. How do astronauts get on the moon? By computer. A clock is a computer.

FUTURE

The future status of these students using computers could not be forecast. The teacher knew there would be a full class of computers for the 1988-89 grade three class. She hoped the present grade 3 class would have access to computers for at least one hour per day so they could continue working on the computers and not lose their skills.

Teacher: I also realize that these children of mine need to be able to

> reinforce the skill that they have learned this year. They could lose a lot of this by not being able to practice.

This time would be in the afternoon when the grade 3's were not on the computers. She felt the present class would not continue to keyboard well if they were unable to use computers for the next few years.

She did not have any long-range forecast for computer use. Her wish for the group was that the grade 5 and 6 classes would have the use of computers.

> Teacher: It may not be a class effort but rather a machine there so small groups of students can have access to it and keep their skills up that way. I don't think we can really afford to set up another full lab. It would be nice to have another lab at the five-six level and use this lab as a three-four lab as it is intended, but I am not sure the finances will be there or we will be supported through our project to do that. If it works out it would be great.

She planned to use the strong students the following year to help teach the keyboarding to the novice typists.

The principal was in agreement with the teacher. She felt the project should be refined and many of the things learned in the first year be put into practice the next year. The next year's class would be very much like a regular classroom experience. Hopefully, any problems experienced this year would be corrected and the second year

would be a little less painful and more comfortable for everyone involved.

The first-year's class would be committed to computers the next year. It would be a major responsibility to ensure the curriculum material, software, and personnel be available to allow the students to extend and practice what they had learned their first year. She said,

> Principal — I think keyboarding is essential. The implications for schooling for the next few years are tremendous. It is important that this aspect of a child's learning be acted on and implemented by the various authorities involved. The articulation between elementary and junior high schools must be there. When you look at where we were in 1981 and where we are now there has been nothing but phenomenal growth in the number of computers in elementary schools and I think it will certainly continue.

The principal's feelings about the project were very positive.

> Principal — The excitement of having a centre that had something happening in it that was educational in the school was truly a wonderful thing. There were a number of people from all over coming in, giving us the opportunity to verbalize, reflect, and evaluate what exactly was happening. As well, there was a great deal of curriculum development taking place. It allowed opportunities to bring people together to dialogue about childrens' learning.

FUTURE EMPHASIS ON INSTRUCTION

Keyboarding Instructor. It became obvious early in the project that the teaching methods for elementary students had to be different than the methods for junior high students. According to the keyboarding instructor, "...I think the developmental process is different (between elementary and junior high) because of their age." The keys that elementary students find difficult are not the same as junior high. Their ability to scan the reading material differed, consequently the length of the line was shortened. They did not have the vocabulary of a junior high student. The lessons had to focus on the vocabulary that they possessed. Their learning tended to be much more literal. They had to know the meaning of the words on the page or they would not type the lesson.

> Knowing that, you have to throw out materials that have been developed for junior/senior high. Make sure vocabulary is such that they understand it.

There were changes to be made when rewriting the lessons.[81] The number of keys taught per day would be increased to a minimum of two. "I would have to do radical revisions to the beginning lessons." The keyboarding instructor felt that as she became more familiar with the students and their writing her lessons were more applicable to an elementary class. Consequently revisions to later

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81. Based on the experiences of the first year of the project, the lessons were rewritten by the keyboarding teacher and field tested the following year.

lessons would not be as extensive. Before teaching another group of elementary students, she would like to see more of their written work. This would furnish her with a better sense of their vocabulary level and the keyboarding lessons would be more in tune with the students.

> I would also request that while students are learning to keyboard that they not do writing on the computer. Writing should be delayed until the alphabetic keyboard has been taught. Otherwise, there seems to be a hidden message that in keyboarding you do it one way, but when you do your other work it does not matter.

There was considerable teacher involvement in the learning process. It was important the teacher pace and orally dictate. The students needed guided practice throughout the learning of the keyboard. "30 to 35 lessons must be guided." If told to do the lesson on their own they simply said they were finished.

More emphasis should be placed on teaching them how to read a word from the page. They must read the words at the letter level and not the word level. The students must watch the overhead screen or their lesson sheets when dictation is done.

> They need to learn very early to read from the paper and to read at a letter level. They grasp words in their mind, memorize the words, look at the monitor while typing the words, then look back to the paper. The issue is to teach these students to type by touch with correct technique rather than emphasize increasing the skills of speed and accuracy. I think the more they write the faster and more accurate they are going to become.

Extensive drill work was not necessary as they built their typing skill through their writing. "It is important that the learning experience be very positive."

The students should print their work early in the beginning lessons. "As soon as we started printing out hard copy they became much more serious about keyboarding."

To be successful you cannot have a room where you have one or two computers per room.

> If the computer is to be used successfully in language arts you must have a program where the students learn to keyboard as the class rather than individually. If this is not done, teachers will rely on software to teach keyboarding and I do not believe software can teach keyboarding!

Software can be useful for remedial work after the keyboard has been learned.

Teacher. The teacher had some definite plans for teaching keyboarding the following year. More effort would be spent incorporating the students' spelling words into the keyboarding lessons.

With the completion of the project for the year, it was interesting to hear the general comments of the teacher. Initially she did not feel that it was a large project but as the year progressed she found it to be a horrendous project to try to do on her own.

> Without realizing it, I thought I could handle it when school started. I was so thankful that the keyboarding instructor came out to teach keyboarding rather than just giving me verbal advice on how to do it. It has been extremely helpful to have the extra people in the classroom to help the students get their keyboarding

technique correct from the beginning. Breaking habits after they have been formed is almost impossible. Getting the technique correct from the beginning is most important. Having other people to keep an eye on the students has been most helpful. It would be difficult to do on one's own. It is needed that first month in the Fall just to establish good keyboarding habits.

She felt it was important that there be a number of people to help with the keyboarding as students at this age do not work well on their own. One of the students in the group broke her arm the first part of October. The keyboarding instructor made up special lessons for her to use with her broken arm. She was on her own a lot of the time and certainly was unable to keep up with the class. She would keyboard if someone helped her pace the drill. However, if we moved to help someone else she would sit at her computer or unattached keyboard holding her teddy bear. There were days when she accomplished very little.

Students. The students were asked how they would be using computers next year and in the future. Many of them felt they would be writing stories and poems on the computer in the future.

Manfred: In the future I would do word processing, letters, data bases, and use programs.

John: I would be writing adventure stories. Maybe, I'll be an author.

Laura: I would write long, long stories. I might be an author.

Fred: I might be teaching computers. I would teach people how to use computers.

The students had definite views on whether or not everyone should use a computer. Their responses to this question were surprising and unexpected. When all but one student liked the computers, it was expected that they would say that everyone should use a computer. That was not the case. Fourteen of them said that they did not feel everyone should use a computer. Their main reason was that not everyone might like using a computer or have one available. The Students stated:

Nat: No, cause some people don't have enough money to buy a computer. People like to use their hands sometimes too. They might like holding a pencil better.

Charles: I don't know if everyone should. Some people might not like computers.

The students that said yes agreed with the statement given by Noel:

Noel: Yes, so they won't do something wrong and won't ruin the computer. So they know how to do it to play games and stuff such as stories and to load files.

Some students such as Fred said yes and then changed their response to no.

Fred: Yes, because they learn at the beginning of the year. I mean this classroom. Everyone else maybe not because they may not have gone to computer school."

WHO SHOULD TEACH ELEMENTARY KEYBOARDING

The keyboarding instructor felt the best person to teach keyboarding is the elementary teacher as she understands where the students are coming from. The business education teacher views keyboarding as a subject first for personal use and then as a vocational skill. Business educators focus on formatting, speed and accuracy. The elementary teacher looks at the computer as a tool for communication.

Elementary teachers should be provided with inservices to teach keyboarding. The prime focus should be technique development and "touch typing". Speed, accuracy and use of the delete key should be deemphasized.

STRENGTHS AND WEAKNESSES

When asked about strengths and weaknesses of the project, the participants did not give many weaknesses. They felt that the project had been successful. The students could "touch type" and were using the computer for language arts. The teacher and principal felt the quality and quantity of the work done was remarkable for a group at this age level.

Both the principal and teacher felt that if there was a weakness in the project it was time. Time was insufficient to work on the students' handwriting skills. The teacher added, "However, spelling and writing have improved so there has been a gain in the students' academic work."

Another weakness that could arise in teaching keyboarding is fitting it into the already full and busy timetable? What gets left out of the timetable? The teacher felt that several subjects were included in the keyboarding lesson. Subject material from such subjects as language arts, science, and social studies were easily incorporated into the lesson.

> Teacher: We do have a full timetable and I guess if I have left anything out it would be cursive handwriting that we normally teach, although I have introduced that to these students. I have not practiced it nearly as much and I think that some of these children are probably not as good in cursive writing as it they would have been if I had drilled it more. Another thing that I cut back on was dealing with spelling in a more formal way knowing what they are doing in keyboarding is reinforcing their spelling.

A conscious effort was made to incorporate language arts and other subject material into the keyboarding lessons.

The principal felt weaknesses were not evident in the project but,

> Principal If there was weakness, it would have been the hours needed to run such a project. The hours it takes to run such a program were horrendous but the teacher just did it.

According to all the participants in the project it was a success. The students could "touch type". The quantity

and quality of work done by this group in the language arts area was phenomenal.

Jim summed up the year on the computers when he typed a computer report on January 5, 1988.

COMPUTER REPORT

> I like the computer because it can do programs and pictures and whats really interesting is you can hook a phone up to a computer. You can find out interesting things. But a computer isn't a bed of roses it makes mistakes just like you and me. but you should know that a computer can do a lot more work than me or you. This whole wide gigantic world needs computers with them to do some work. But nobody said in this whole wide gigantic world that computers are the best.

CHAPTER 7

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

> "A major purpose of Sunrise Apple Centre for Innovation is to **develop, test and disseminate** computer-based curriculum materials. Another purpose is to create a **working model** for integrating the computer into the curriculum, particularly in the Language Arts and Mathematics areas."[82]

The intent of the study was not to evaluate a current curriculum, but to study and evaluate a curriculum in its developmental stages. How did students relate to the computer and could they use the keyboard for other subjects such as language arts and mathematics?

My background in the keyboarding area was in the secondary school level so teaching keyboarding to primary students was unique. The aim of teaching keyboarding at the secondary level is to allow students to use it for personal use, job entry, or further educational programs in business. The objective at the primary level was basically to use keyboarding as a tool for language arts and mathematics.

The intent of teaching "touch typing" to grade 3 was to develop efficiency in keyboarding. To do this the students must be able to:

1. locate and properly use all alphabetic keys, and service mechanisms,
2. use correct spacing,

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82. Ubelacker, S., Cathcart, G., "Integration of the Computer into the School Curriculum" Outlook in Business Education, Spring, 1989, McGraw-Hill.

3. use correct fingering and technique on the keyboard,
4. keyboard with accuracy and speed, and
5. do language arts on the computer.

ACTIVITIES USED IN TEACHING KEYBOARDING

A number of different activities were utilized in teaching "touch typing". The overhead projector was used for introducing the new keys and reaches. The oral pacing of the lesson was done by the keyboarding instructor primarily from the overhead projector and the lesson sheets. These lessons included short words and sentences relevant to grade two and three students.

Timed writings were given at four different intervals. Half the class worked on the computers and the other half worked at their desks with paper and pencil. By the third timed writing all students could type faster than they could write. These timings were given to check their speed development not for measurement purposes.

In November the students were given a sheet of paper with hands drawn on them. The alphabet was at the top of the sheet. They had to match the letters of the alphabet with the finger they used for typing that letter.

"Art typing" was used for special holidays and as a break from the normal routine of keyboarding drill. The class became very excited when a picture would start to develop on their computer screen. It was a fun exercise which most liked to play and did so very diligently. For a

Christmas picture they used their names and "touch typed" them in the form of a Christmas tree.

The students enjoyed word building. They worked on these exercises very industriously. The students were given the letters "be" and they had to think of as many words as they could that started with be. It might be words that started with "m", names of towns in the province, or all the animals that they could think of in a short amount of time. When asked for their words, there would be much volunteering. They became upset if they could not offer their word to the class.

EVALUATION OF STUDENTS

Formal evaluation was not a concern at this time. Speed and accuracy was not measured for evaluation purposes. The students were given short timings weekly, but it was done to improve their speed and not for evaluation purposes. From September to December, they were given three major timings to see how they were doing rather than to evaluate them for record purposes. Checking their progress on posture, fingering and technique was an ongoing process. It assisted in the focus for future lessons.

FINGERING

During the initial stages of learning to keyboard there were problems but they were not unexpected. Some of the keyboarding reaches were difficult which is common with

beginners. Movement of the middle and index fingers, up reaches, and keyboarding the shift keys presented problems. These difficulties in fingering were eliminated as the year progressed and at the end of the year the students "touch typed". They sat up straight, used correct fingering, and kept their eyes either on the monitor or paper. All could "touch type" as fast as or faster then they could write.

COMPETITION

There was more competition than expected. When doing graduated sentences, there was much excitement. As soon as they had completed a sentence they would shout to the class that they were completed. The reaction was usually the same every time graduated sentences were given. It was common to hear the students comment that they could keyboard faster than another student. They would also ask who was the fastest typist in the room.

THE COMPUTER

The students quickly discovered how to use the various function keys. Experimenting was done early in the course. When teaching keyboarding it was important to deemphasize the delete key especially for error correction. The class was determined to have error-free copy, so it was difficult to encourage them to ignore the delete key when they were "touch typing".

Review of the keyboard was done weekly starting in January, 1988. The computer now was the tool for language arts activities.

The students could use the computers exceptionally well. They could load, find, edit, save, and print files. They were very proficient at using function keys. They could set margins, centre, justify, rename, and double space their work. They were competent at formatting their work according to instructions given by the teacher. If they were told to leave a top margin of one inch or double space the work they were capable of doing so.

Initially, when typing their stories they asked the other students, the teacher, or myself to help with spelling, grammar, and word usage. By the end of the year they did most of their own editing.

As soon as the students started to print out their stories, the length of their work increased. Seeing the hard copy was an inspiration to write more. The quantity and quality of work increased.

STUDENTS' PREFERENCES

In early January when students were asked whether they wanted to do their writing on the computer or on paper, only one student chose to use paper and pen. When interviewed in June only one student said that the computer hindered his writing. More than half of the class said that the computer helped them to write faster and it was easier. One of the

main reasons that computers helped them to write was the ease with which corrections could be made. Many said it was easier to correct with the computer. Seven of the students interviewed liked everything about the computers.

All felt it was easier to use a computer than pencil and eraser. When using the computer they did not have to worry about sharpening their pencils or hunting for an eraser. When writing if you did not have an eraser you would not be able to correct your work. Sixteen said they liked to play games on the computer. Twelve liked to write stories.

The mechanical aspects of the computer the students liked the least. Switching disks or loading programs took too much of their time. The many cords were a problem. Several students felt that tripping on the cord caused them to lose their programs. The beeping when a mistake was made was not appreciated.

STUDENTS' VIEW ON KEYBOARDING

Nine students found it difficult to learn "touch typing", but it was easy once the skill was learned. "It is easier because I know the keys."

The students' families and friends were pleased with their progress. Some of them attempted to teach their friends or parents to "touch type".

Since all but one student liked the computer, I expected they would believe that everyone should know how to

use a computer. This was not the case. Fourteen of them said that not everyone would or should use a computer as some people would not have computers available.

PERSONAL ASPECT OF LESSONS

The lessons had to be relevant in order to keep their attention for any length of time. There was considerable excitement when the class received stickers on Mondays. Obtaining the appropriate sticker was very critical. They were unaffected by the flow of visitors. They would continue whatever they were doing when visitors arrived in the room.

The students enjoyed drills involving word building. They took pride in keying a new word and then shouting it to the class. They were disappointed if they did not get to disclose their word to the class .

Games were the groups' favourite activities. They enjoyed games, "art typing", and graduated practices on the computers.

With this group you never assumed that the students would type a line two times just because you had directed them to do so. If the lesson did not have the line typed twice, the students did not keyboard it twice.

Initially the students shared computers. It was common to see them let their partner take over the computer even though it may not have been the partner's turn. They shared disks, books, and assignments.

CONCLUSION

In support of the initial assumptions, elementary students can "touch type" and can do it exceptionally well. They prefer computers over pencil and paper for language arts. The computers did not intimidate them and they were willing to try any available computer application. The fact that more than half of the students in this class had computers at home illustrates the integral part computers play in young peoples' lives today. All students had some experience with computers before entering this setting.

The material used to teach "touch typing", is not the same as the material used for junior and senior high students. The textual material in junior or senior high textbooks is inappropriate for an elementary student. It is much too difficult and irrelevant. If the material does not relate to the elementary students' experience they basically "tune" out! The material must be relevant to their personal experiences. It is crucial that a different textbook for elementary students be used.

Reaches for the shift key, the down reaches, and the reaches involving the index and middle fingers cause difficulties. The shift keys and some of the down reaches should be introduced later in the keyboarding course. At least two new keys should be introduced for every 30-minute lesson. When only one key was introduced the students lost interest. Every fourth lesson should be a review lesson.

Timed writings should be given for feedback, not to evaluate the students' progress.

The scanning ability of elementary students requires that lines be short in length. Thirty-minute lessons are recommended for four days a week for approximately 40 lessons. The presentation of the lesson should be both visual and oral. Teacher pacing should be done for almost the full 30-minute lesson. To provide for both visual and oral learners, the teacher should use both the overhead projector and oral dictation of the lesson. As the students read from the
overhead transparency the lines are dictated and the students quietly vocalize the lines as they type.

The transition of reading from the overhead transparency to reading from a lesson sheet can be difficult. Emphasizing the importance of reading from copy should be done extensively when instruction changes from overhead projector to paper copy.

The students tend to type by word. Pacing is to be done letter by letter rather than by word.

Hard copy of the students' work should be produced early, preferably by lesson 4, the first review lesson. Students see the relevancy of keyboarding. Their attitude toward keyboarding becomes more positive once they see a printed copy.

It is vital that students are not compelled to focus on accuracy. The students in this setting were concerned with the correctness of their work. They started using the delete key early in the keyboarding lessons. If accuracy is focused on, speed and "touch typing" are thwarted. Initially it is important to concentrate on speed; accuracy will appear with practice. "Fluency is hampered if too much attention is given to accuracy."[83] Initially focus on speed, accuracy later.

Incorporating material from the students' other courses is critical in a keyboarding course. The words need to be familiar, preferably words that are part of their spelling and reading vocabulary. Word processing activities should be integrated into the language arts curriculum. Initially keep the writing assignments short, but as they become more proficient and comfortable using the computer make the assignments longer. It is important that students' do not conclude that the keyboarding course is a separate entity from the other school subjects. The keyboarding should be considered a "tool" to be used for school subjects.

It is vital that the entire keyboard is taught before the students use the computer for other subjects. Once they have learned to "touch type" there are many language arts applications for the computer. They can use the keyboard

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83. Ubelacker, S., Cathcart, G., "Integration of the Computer into the School Curriculum", Outlook in Business Education, Spring, 1989, McGraw-Hill.

for such activities as: writing notes to parents or friends, keeping a diary, doing a study of a novel, writing poems, keeping a data base, or incorporating it into their reading assignments. If they are well grounded in keyboarding technique, they will not revert to poor habits as quickly when they start using the computer for their other work.

The teaching of the elementary keyboarding should be done by elementary teachers preferably after attending inservices given by business education teachers. Business education teachers do not have time in their schedules to teach elementary students. They are not familiar with the capabilities of elementary students. Elementary teachers are aware of the elementary students capabilities and attitudes and with instruction are capable of teaching keyboarding to elementary students. Assuming this were to transpire, students entering high school keyboarding programs would arrive with excellent techniques rather than the "hunt and peck" techniques they are arriving with now! This would leave the high school keyboarding instructor more time to focus on production work.

When elementary students are working on computers, it is important the furniture fit the student. The keyboard and chair must be at the proper height. If the height of the chair and keyboard are correct, students will be able to place their feet flat on the floor; their arms will rest

comfortably at their sides with their fingers on the home row. Their hands, when fingers are on the proper keys, will be parallel to the keyboard. The palms should not rest on the keyboard.

Elementary students like to use the computer because it is quick, produces uncluttered-appearing work, and is easier to use than paper and pencil. Without being able to "touch type" this would not be so. A student summarizes these thoughts:

I LIKE COPUTERS

by Heidi

> I like computers because they help you work faster and it is a lot neater. I like computers because your hands don't hurt as much as when you use a pencil. The thing I dislike about the computers is that you have to use the delete key and that means you have to take one of your hands off the keyboard. That is because Dr. UBELACKER did not teach us how to do it. I like the furniture it is a lot nicer and a lot smaller and a lot clener than the other deskes.

RECOMMENDATIONS

A limited amount of research has been done in recent years with elementary students and computers. Since computers have just come into the schools in full force over the last ten years, it is not surprising there is an inadequate amount of research done in this area. Claims are made that computers will benefit students in their school work but there is very little evidence to substantiate these claims. If students are to use the computer as a tool they must "touch type". "Writing on a computer without touch typewriting is similar to writing on newsprint with a short, dull pencil."[84] It is important that the keyboarding program be structured and there be a language arts program for the computer. Most important, each child should have access to a computer.

The students in this study were motivated to keyboard. There is concern about what motivation the child has to want to keyboard, and more study needs to be done in this area. An elementary student can touch type. It would be interesting to know, however:

1. How much keyboarding skill will the child retain if no further practice is done after one year?
2. How much practice does the child need to be able to touch type well while composing and editing stories?

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[84]. Ubelacker, S., Cathcart, G., "Integration of the Computer into the School Curriculum", Outlook in Business Education, Spring, 1989, McGraw-Hill.

3. All adult participants in this study were convinced that spelling and the quality and quantity of stories had improved. Exactly how much would children improve in the language arts area?

4. When is it a good time to teach the delete key, the down reaches, and the shift key?

5. Is it better to teach the keyboard quickly and then have the students do more practice or drill work?

6. How does the student view his/her other course work when it can be done on the computer?

7. What curriculum materials should be used with primary students?

We know elementary students can "touch type" but much research needs to be done in this area.

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APPENDIX A

ART PICTURE OF GHOST DONE OCTOBER 30, 1987

APPENDIX B

POETRY DONE IN FEBRUARY

FEBRUARY
By

F amilies are special , bring fun and happiness
E veryone needs love and company
B eing together, having fun
R emembering other happy times
U sefulness of being loved
A nimals that are loved
R ed Valentine's hearts
Y ou are liked and loved

FEBRUARY
By

F amilies are special , bring fun and happiness
E veryone needs love and company
B ring friends and gifts.
R emember your Mom and Dad
U ncle is kind and nice
A nts that crawl your sleeves
R ubber egg that bounces like a ball.
Y ou are funny.

FEBRUARY POEMS
by

F is for family a big loving family
E is for everyone everyone loves a family
B is for buds, buds for flowers
R is for running with a friend
U is for spending Valentine's with your Uncle
A is for arrow Cupid's arrow
R is for rushing through the snow
y is for yummy cookies

APPENDIX C

FRIENDSHIP TREE DONE IN DECEMBER

FRIENDSHIP TREE

Use your automatic centre feature for each line. Can you find your name? If not, insert your name for one of the names which has the same number of letters as your name.

*
***
Lisa Emma
Nicole Tim
Trish Melynda
Rebecca Lindsay
Kristina Danielle
Tracy Kim Rita Carol
Reg Pablo Laura Michael
David James Jared Daniel
Jocelyn Janis Sara Jessica
Damien Nathan Cagla Alexander
Tyler Paul Kaeli Austin Madiha Noah
Tae Goo Ryan Jonathan Anna Kerry Judy
Soreiya Chad Alyssa Chung Christy Orrie
Kristin Vinay Alexis Joanne Jolene Chris
Nwaneka Victor Jacinda Jordana Tawiah Darren
Michael Laura Awotwe Naomi Dieter Robert Felix
*****
*****
*****

APPENDIX D

LANGUAGE ARTS WORK DONE AFTER ALPHABETIC KEYS COVERED

FLAT STANLEY GOES TO THE POOL
By

Flat Stanley asked his mom if he could go swimming at the swimming pool. His mom said yes, so off he went down the road and soon he came to the swimming pool. He saw that the cover was over the pool. Then he saw the vent at the side of the pool. He was so skinny that he slid down it into the water. His mother was nearby picking flowers with arthur and she saw Stanley go under the pool covering, she let out a shreak so loud that the neighbours heard. They came rushing down the street to see what happened. They saw where he was and went off to get the police. While they were gone his mother was just screaming her head off and so was Stanley. All of a sudden Stanley stopped breathing. His mom was so terrified that she kicked a rock by accident that rolled to the vent that Stanley had come through. She took a knife out of her pocket and tore it open BUT she accidently tore off Flat Stanley's skin and the cover but he was saved.

Flat Stanley was so swolen that he was back to normal and he was a normal shape again. Flat Stanley's Mother had to pay for the pool cover and that was the only thing that was disappointing.

APPENDIX E

EDITED WORK DONE IN MAY AND JUNE

UJIMA- to share the work of building a community

The people that live in the village earned their living by raising crops. They lived in little huts and every year at harvest time the women would paint pertty dizins on their houses.

In the village there was a river that was Bababa that ment father it severd pourses for the men by fishing and washing close for the women and for the children water to swim in.

Modupe lived up the top of the mountain and his wife had died and his children were grow en up and marry. He had a little hut and crops then one day he was standing on the top of the mountian and he saw that the dam was breaking and water was spilling. There was no time to run down so he put fire on his and the people saw and ran up the hill when they got there was no time to ask what had happened and loss had been made. The people started crying then Modupe cofered them and said I have my crops are here I will share till you can start a new village then the people started to sing and they remembered that by saving a friend they had saved them selfs.

APPENDIX F

SAMPLE OF HANDWRITING DONE IN JUNE

Imani means faith.
Imani Faith

One day Beggie and her father were im the feild her father gave her a egg then he said to sing to it each day and if you miss one day it will lose it powers One night Beggie said she had made up a song for you my egg and she sang it then a voise said Beggie it was her mother. The next day Beggie told her mother her dream her mother said was her faith.

APPENDIX G

READING ASSIGNMENTS

HUBERT'S HAIR-RAISING ADVENTURE
By Bill Peet

Words to know before you read:

mane -- long, heavy hair at the neck
haughty and vain -- "stuck up," very proud
ignited -- set on fire

1. How did Hubert lose his mane?

✓ Hubert lost his mane by a spark of fire that went th~~rew~~ough the woods.

2. Why didn't Hubert want the other animals to see him? (p. 3)

✓ Hubert did not want the animals to see his b~~ø~~a ld head he thought they would laugh.

3. What would you tell Hubert to do to solve his problem of having no hair?

✓ I would tell Hubert to w~~are~~ear a baseball cap so the animals would not see his bold head.

4. On page 22, why did the animals suddenly give so many reasons for not going to visit the Crocodile in the swamp?

✓ They did not want to go because they were scared of the crocodile and they thought he would eat them.

5. What would you do with the stacks of hair that are left? List as many ideas as you can think of.

✓ You could make a hair hat and make a soft bed with the hair.

APPENDIX H

BOOK REPORTS

BOOK REPORT
by

Title: Huge Harold

Author: Bill Peet

Date: 1961

Setting: Contry-City

Characters: The main character is Huge Harold he gets to be a very very big rabbit another character is Orville B. Croft he was a nice man and and treated harold kindly.

Plot: Harolds plot was being hunted and killed by the farmers and hunters and they could see him easly becsuse he was so big.

Favorite part: My favorite part was when Huge Harold won the race and the hole crowd gave him treats such as lettuce, celery, spinich and beets and some carrot ice cream.

Recommdation: I think people who like and love rabbits would enjoy this story because it is about a big big rabbit and at first he is a normal rabbit then his feet begin to grow they got bigger and bigger then they stopped but then Harold begain to grow. He grew five times his own parants size and that is all I will tell you and you can read the rest of the story to your self.

BOOK REPORT
BY

Title: Huge Harold

Author: Bill Peet

Copyright: 1961

Setting: This story was set in the country out doors.

Characters: The main character was Huge Harold other characters were: Huge Harolds mother and father, foxes, weasels, owls, pig, cows, farmer Oliver Hatch, two boys, 3 hounds, 4 farmers, farmer Orville B. Croft, 2 horses Buster and Ted, racing horces, and crowd of people.

Plot: the plot is Huge harold is being chased by farmers.

Favorite part: When Huge Harold hid up in the tree.

Reccomendation: I reccommend this book to ages 4-8 also I reccomend this book to country , animal, outdoor lovers.